

ICT for Education and Development

The Challenges of meeting the Millennium Development Goals in Africa

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Contents

Editorial Preface	3
Executive Summary	6
The Expansion of Telecommunications	16
Part 1: Millennium Development Goals	23
Meeting the Millennium Development Goals and the role for ICT	24
Human rights, Millennium Development Goals and ICTs	33
MDG1: ICT and Poverty: ICTS, means or ends?	43
MDG2: Achieve universal education	58
MDG3: Gender Equality and Women Empowerment	64
MDG4: Child Mortality	71
MDG5: Maternal health	77
Putting All Our Eggs in one Basket	91
MDG6: Combat HIV AIDS	97
MDG7: Progress toward achieving the MDG: ensure environmental sustainability	110
MDG8: Global Partnership for Development	119
Part 2: Technologies for development	128
2.1 Stimulating development from the “bottom of the pyramid”	129
Low-Cost technologies and micro-finance	129
2.2 Telecommunication Networks	133
2.3 ICT for education and development. Software opportunities	154
2.4 Open Source in Education and Development.	178
2.5. A Curious Divergence: The Generational Encapsulation of ICT Advocacy	189
2.6 Internet Governance	203
2.7 Psychological Consequences of the Introduction of Internet Technologies	223
Part 3 Applicability of ICT for development	231
3.1 ICT for Development - A Critical Outlook	232
3.2 The Global Marshall Plan: Making use of ICT’s potential for a World in Balance	241
3.3 Overcoming Technological Divides	249
3.4 Telecenters in Nigeria	258
3.5 When the basics are cutting-edge: radio for development in Africa	268
3.6 Training teachers using blended e-Learning. A PPP project in South Africa	274
3.7 Energy for ICT Development	285
3.8 Proposal for a Education Complementary Currency	289

Editorial Preface

We have the pleasure to present this book which is a reflection arising from the background of activities and research for the Digital World Africa Conference 2006 on ICT for Education and Development. This event has received the sponsorship of the Nigerian Communications Commission, in partnership and collaboration with the Growing Businesses Foundation (GBF) and the tt30 Club of Rome (CoR).

It is now imperative that embracing the age of information and knowledge societies is a must for every country on earth. It is also widely recognized that education -formal and non-formal- is the key for fighting poverty, enhancing human development and achieving the various Millennium Development Goals. Today, access to information and to knowledge can be significantly enhanced by new and widely available technologies. One challenge is therefore to ensure a policy of 'inclusion' in the world's overall technological environment, and to further this within ethical and practical measures that secure social and economic integration for Africa within the global village.

Looking at information and knowledge as human capital, we recognize that technological innovations and globalization trends are transforming the globe into knowledge-driven economies. A shift from traditional resource-based capital towards knowledge-based economies has made human capital (and its main component, education) a leading public policy theme. Given the policy relevance of human capital in a knowledge-based economy, it is essential that its definition, measurement and specification in the context of .developing economies is adequately captured and addressed at a theoretical and practical level.

The practical realities in bridging the digital divide are challenges for many people. The people in rural Africa are particularly poorly equipped to get involved in designing digital bridges for their communities given the poor infrastructure, high levels of illiteracy, and an established pattern of rural-urban population drift (and brain drain). Ideally digital bridge building should be a collaborative venture from an early stage, needs driven as well as technology driven, which takes into cognisance the practical realities of the people served.

One value added is that ICT for Education, Development and Empowerment should target children and youth to enhance their learning process particularly. As Professor Negrofonte of the Massachusetts Institute of Technology has said: Preparing students for success in a knowledge-based science- and technology- rich society requires more than dispensing facts and practicing textbook skills. It requires developing new ways of thinking. It requires a culture of science, information and global understanding. The question we address is how this essential work can be accomplished in distant communities, so far poorly served by the digital revolution, where teachers know of the new technology only from poor or incomplete descriptions in books. Our answer is to provide every student with a personal laptop -- a full-powered computer with permanent wireless connection that can be used at home as well as at school, and is easily carried to places of play, culture and social action. Quantitatively this permits more high quality

learning than can be achieved in the hours spent at school. But the real gain is qualitative: the \$100 laptop removes the barriers that separate learning from living, school from family and society. It embodies the new culture and fosters individual growth within that culture. Just as a language is best acquired by speaking it, a culture is best acquired by living it.

The question to ask is: what is the role of capital, institution building and entrepreneurship in promoting education and development? The answers to this question are reflected in the technical panels that discuss this matter at the conference mentioned earlier. Capital in Africa is generally invested in major urban centers however the majority of Nigerians (over 65%) live in the rural areas. The new Microfinance Policy Guidelines released by the Central Bank of Nigeria and promulgated by the Federal Government of Nigeria since December 2005, as well as several other initiatives (NDDC, PTF, NAPEP, UCB, GBF, CIDJAP) promote investment in education and development. They have identified capital provision, institution building and entrepreneurship in the rural and semi-urban areas as key success factors. Certainly, increased investment in the rural sector will help integrate yet-isolated and undervalued communities with the urban sector and the global economy, as well as enhance its potential and empower its peoples.

For example, the importance of technical infrastructure and an enabling environment lead to studies such as that of the World Bank. The study indicates that for every \$1 in telecommunications infrastructure, more than \$6 is generated in local returns by its impact on local employment and general economic growth. Telecommunications infrastructure in Africa is developing, with growth rates faster than anywhere else in the world. This is a reflection of the level of potential for growth still inherent in our African economies. The challenge is in harnessing this potential of technical infrastructure and an enabling environment to promote far-reaching education and development initiatives.

What can be done to encourage local content development? Stakeholders in the information and communications technology sector generally agree that the ICT sector should fulfil its role as a key driver of the new national economy, providing jobs, improving service delivery and improving Nigeria's Gross Domestic Product. The proposition to lay more emphasis on the development of software, as well as hardware, is a key element in achieving these goals. It will require the provision of an enabling environment and private sector motivation to invest as well as access to national and international markets.

Emphasis was laid on the use of ICTs for children, computers and the concept of 'learning learning'. This is captured in the slogan 'Blackboards to Smartboards'. In the words of Professor Seymour Papert: Part of learning is getting information which might come from reading a book or listening to a teacher or by visiting sites on the Web. But that is only one part of education. The other part is about doing things, making things, constructing things. However here too there is an imbalance: in large part because of the absence of suitable technologies, the constructional side of learning has lagged in schools, taking a poor second place to the dominant informational side. The primary way that digital technology will help is to provide more opportunity for wonderful teachers to

work with wonderful students on projects where they will jointly exercise wonderfully powerful ideas

*Civil Society Organizations (CSOs) and youth play a critical role in actualizing and putting into practice the ideals of bridging the digital divide. They have the potential to reach out to the population, of which youth (under 35's) make up 70% of Nigeria's population. Furthermore, 65% of Nigeria's population is located in the rural areas. Both youth and the rural areas make up the target beneficiaries and focus areas of the CSO. The context of ICTs for education and development, the issue of **access** and the need for solutions such as the Rural Telephone Project of the GBF and the Universal Access Program of the NCC, is critical and foremost in delivering practical results.*

*With the launch of the Club of Rome Nigeria chapter during the 2006 Abuja conference, the first African chapter of the Club of Rome will have been inaugurated. **Club of Rome** prides itself as a global think tank and centre of innovation and initiative. As a non-profit, non governmental organisation (NGO), it brings together scientists, economists, businessmen, international high civil servants, heads of state and former leaders of nations from all five continents who are convinced that each human being can contribute to the improvement of our societies. **The Club of Rome's** mission is to act as a global catalyst of change that is free of any political, ideological or business interest. The young think tank (tt30) of the Club of Rome among others, have contributed many articles to this book which originated as a project of the tt30.*

Much gratitude is due to the authors of the various articles and contributors in this book, the panellists, key note speakers and resources persons at the Digital World Conference. The presence and support of the President of the Federal Republic of Nigeria, Chief Olusegun Obasanjo and many of his Ministers specially those from the Ministries of Education, Communications, Science and Technology and the entire Nigerian Communications Commission is praiseworthy. We trust that all the readers of this publication shall find the book both interesting and informative and sincerely hope that information and communication technologies do not become an ever lasting promise of improvement but rather a real engine for change and development. Bridging the digital divide has become an ethical challenge and it is a great privilege to be part of the solution providers.

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Executive Summary

1. Development, the Millennium Development Goals and ICTs

The gap between rich and poor remains wide and many countries still witness and suffer extreme poverty, diseases, ethnic conflicts and man-made or natural disasters. These issues are part of a vicious circle where the inefficiency of the public institutions is backed by high levels of corruption and society faces high debt burdens with low levels of resources and human capital. In order to change these situations, solid and conscious national strategies aim to move towards sustainable development together with external aid, debt relief and improved access to fair international markets.

As a shared commitment aimed at addressing extreme poverty in its many dimensions and setting specific targets to be achieved by 2015, the eight Millennium Development Goals (MDGs) were signed by 191 nations to:

- MDG1: Eradicate extreme Poverty and Hunger;
- MDG2: Achieve universal primary education;
- MDG3: Promote gender equality and empower women;
- MDG4: Reduce child mortality;
- MDG5: Improve maternal health;
- MDG6: Combat HIV/AIDS, malaria and other diseases;
- MDG7: Ensure environmental sustainability; and
- MDG8: Develop a global partnership for development.

Progress towards these goals has so far been slow. While there has been progress in some regions, some countries were unable to make the investments in human capital and infrastructure that were required, and those able to face the investments could not confront all the economical challenges, leaving behind some parts of society. Perhaps governance is often inadequate either because of the ruling elites being corrupted or because the policy makers lacking awareness on how to proceed and neglect core development priorities. Or perhaps the goals were too ambitious without enough international will and allocation of economical resources.

Human Rights have been considered by the UN as a cross cutting issue. The adoption of a human rights based approach in development and poverty reduction strategies should be taken, but still, a strong decoupling between human rights and the development community is limiting the effectiveness of advocacy work and policy reform. The right of development should be understood strongly connected to human rights: freedom and liberties should aim to provide the space for individuals to formulate their own path; this and no other is the meaning of the right to development both at the individual and collective level.

In this frame, the authors of this "ICT for development" find relevant to emphasise the role that Information and Communications Technologies (ICTs) can play supporting development and the achievement of the Millennium Development Goals. Information and communication technologies also offer an entire new range of opportunities for the realization of the right to participation and are becoming a key component of advocacy strategies, networking or peace negotiations. It is now required that decision makers urgently form a precise understanding of the relationship between information and communication technologies with development, and start using all available tools to take the maximum benefit of such infrastructures.

The following sections of this summary elaborate how ICTs can support the development and the achievement of the MDGs. Before going through that analysis it seems relevant to face an important ethical question: primary needs are often not satisfied and many humans are still lacking basic goods such as of food or water. Can we ignore these needs and use available resources to develop information infrastructures? Even if the answer has to be soberly considered, it seems that the implications of ICTs deployment and use are simply too large and too obvious to be ignored, therefore the right balance has to be sought, trying to provide countries with the infrastructure that may finally improve people's situation.

The spread of information and communication technologies hold the promise to greatly facilitate the achievement of the Millennium Development Goals and within this line of thought, the United Nations World Summit of the Information Society of 2005 established the "Tunis Agenda", asking investments to expand capacity building and to create regional infrastructure extending the application of ICT infrastructures to different development sectors. Such kinds of infrastructures are not only hardware and software provided with some training. The right infrastructure is such that can guarantee their maintenance and a minimum of profitability as to be sustainable, choosing the right technologies –starting with the existing ones- and letting people to get involved avoiding the scattering of black boxes, that local users can not operate.

2. Investing in ICTs

Investment in ICTs can be oriented towards consumption or production. In what context does investing in ICTs contributes better to reducing poverty and achieving development? Evidence through practical experience in the world indicate that investing in ICT consumption might contribute mainly to increasing human and knowledge capital, while investment in ICTs production seems to be a more effective tool for development of the whole society. In both cases ICTs can create new jobs and entrepreneurial opportunities.

For the adoption of information and communication technologies, population has to be aware of the possible uses and benefits of technology thus creating a real demand of services and applications. This will only happen once that contents are culturally adapted to the environment respecting language, religion and traditions of users.

ICT production includes creation of hardware, software and other components of the ICT infrastructure, and not just helping large hardware and software firms in developing countries. Production encompasses consultants, trainers, Internet service providers, data services providers, application providers, web designers etc.

In particular, a key sector worth mentioning is software development. There are some characteristics of software that make it different from other industrial sectors from an economic perspective: lower entry barriers than other ICT sectors and production knowledge relatively easy to acquire. Additionally, software is strongly incremental and code re-use is a common practice both by proprietary and free/open Source developers. This feature allows sparing unnecessary efforts on the development of state-of-the-art methods and algorithms, hence focusing on personalization or innovative steps. These characteristics enable countries and regions with qualified workers and minimum capital for the creation of companies. There are still many software innovations to be developed, such as cultural adaptation, environmental interaction, ubiquity, artificial intelligence, system integration... At the moment, when outsourcing of software production from countries with high labour costs is becoming usual, developing countries have an opportunity for the creation of a local software industry.

3. Use of ICTs within development

3.1. Education, training and diffusion of information

When going into the key areas of ICT applications, education is the first and best possibility to influence in development. The central question is whether and under which conditions the improved access to ICTs can enhance the individual and collective capabilities of people to better achieve the lifestyle they value. It seems that literacy is the key element, and similarly newly acquired 'informational capabilities' can act as an agent for change for individuals and communities enhancing their abilities to engage with the formal institutions in the economic, political, social and cultural spheres of their life. Options include providing children a basic education, professional training, technological literacy programmes and dissemination of information.

Providing children with a basic education is needed and by the time being there is an enormous lack of funding. Some children are unable to attend because of the lack of a school accessible to their homes or because books, school uniforms or tuition fees are a heavy burden. ICTs can help by providing alternative possibilities for education. A concrete and extra effort on education has to be made to compensate for the current situation regarding women. Educated women have fewer children, get medical help sooner and provide better care, education and nutrition for their children. This reduces hunger, infant and maternal mortality, the spread of diseases, and environmental damage.

The low levels of literacy, infrastructure development, factors of physical, economic and social access as well as linguistic barriers still impede the spread of ICTs in Africa. These

problems associated with the adoption of new technologies are often connected with the scarce technical capabilities of users, making it necessary to familiarise individuals with the new technologies simultaneously with the deployment of infrastructures and applications in their mother tongue, their local customs and in harmony with their cultural symbols. In this frame, technological literacy programmes aim at bringing citizens closer to technology by using general purpose equipment running computer programs with simple interfaces which are adapted to the cultural environment are highly valuable. These technological literacy programmes are often carried out in the so-called telecentres, premises provided with ICT infrastructures and specialised personnel dedicated to teaching new technologies to the population located in the area of influence of the centre.

As users get involved using ICTs, new social interactions are appearing via email or chat rooms, and they have profound implications for the social support networks. Social norms are being affected by ICTs, especially, the Internet, which is creating new networks through which individuals can share values and experiences. This sharing might relax cultural barriers and strength cultural practices that encourage health seeking behaviour and, in general, can support a better life. People are inclined to feel more "included" when online, because of the anonymity of users in virtual domains, and the fact that users are not physically present. These factors contribute to the search of information and improvement of daily habits.

Training can also be supported by ICTs. It is increasingly frequent to use these technologies for education of professionals using digital content and remote connections or interactive applications when students cannot go to the training center. In particular, distance learning can support the training of professionals in the health sector, providing access to best practices and directions to improve skills.

Strongly linked to education, the spread of information is emerging through different means such as broadcasting public health messages, awareness campaigns through mass media outlets, dissemination of preventive information, capacity building through online training or public policy advocacy through online discussions and debates. In particular, the knowledge dissemination can be a key tool for sharing medical information: current medical research, breakthroughs in treatment and new approaches in patient care which can be useful for patients, health functionaries, students and researchers.

Some examples of information users are listed next.

1. Policy-makers who use the information and opinion generated through e-networks, list servers, blogs, newsletters and journals as a guide to formulate concrete policies and expediting institutional resources.
2. Donors/Aid organizations who aim to ensure transparency and accountability in logistic, operational and financial commitments.
3. Programme functionaries who need to ensure greater networking and coordination between stakeholders to inform programme planning, delivery and evaluation. They also need ICT-based tools for facilitation of intervention programmes through streamlined surveillance systems for better targeting, monitoring and

- evaluation, besides improved delivery mechanisms. ICTs also provide them a platform for sharing information and knowledge which can feed into better programme delivery in terms of replication of best practices.
4. Health workers including doctors, nurses and paramedics participating in clinical intervention programmes and who use ICT tools for clinical data management, monitoring patient profiles, drug supplies and other logistic requirements facilitating remote consultation in diagnosis and treatment.
 5. Researchers and students who gain from information networking, online journals, libraries and data.
 6. Vulnerable groups such as the youth may learn about prevention of infections through information dissemination tools like websites, on-line journals and newsletters, training modules, E-discussion groups and help lines etc. While being the age-group most vulnerable, the youth are also the most receptive to the use of technology for information and communication.
 7. People living isolated who are supported through online counselling and guidance for a better life, removing socially inhibiting stigmas and prejudices.
 8. Other concerned persons, who are active in building up opinion, pressing for policy initiatives and advocating for a better world.

3.2. Links to the larger health system

ICTs are a key instrument in planning and monitoring public health programmes, especially at the sub-regional or regional levels. Strong and efficient systems and better links to the larger health system are necessary. ICTs can enhance both of these. First, mobile communication networks can improve physical links by expediting the response of emergency transportation. Second, ICTs can create virtual links—telemedicine—between attendants and more highly trained personnel at district and central hospitals. Mobile phones, radio units and digital cameras can all serve to enhance the quality of first-line care provided. Individuals can also benefit of remote consultation about diagnosis and treatment. Patient monitoring, managing drug logistics for patients in health care programmes, electronic medical records are all tools facilitated by ICTs within the health sector.

3.3. Assessment of needs

ICTs can increase the efficiency of social service delivery and raise economic efficiency by reducing costs, supporting management and imposing safeguards against corruption.

- First, ICTs can increase the quantity and quality of population data and, through simple spreadsheets and databases, expedite the organization and interpretation of the data.
- Second, ICTs can easily monitor levels of resources, such as inventory and personnel or anticipate resource gaps. For example, for the administration of

drugs, continuous, real-time monitoring of inventory ICTs can immediately alert managers when supplies fall below critical thresholds. These thresholds could be fixed or linked via information networks to other systems, for instance, within malaria surveillance systems, to estimate needs—in this case, antimalarial drugs—. This application links with the so called "Supply chain management", in which ICTs can expedite each step of the supply chain by creating electronic links between local facilities, procurer's, foreign and domestic distributors and import authorities.

- Third, ICTs can link different providers together to increase coordination. For example, in some areas many different NGOs and government work alongside one another but find it difficult to track each other's activities, which could lead to duplicated efforts, supply shortages or missing the opportunity to work together achieving a better result.

3.4. ICTs for Control and accountability

ICTs can play a critical role in strengthening accountability systems. For instance, the performance of workers can be tracked, budget processes can be transparent or selling prices can be controlled (providing community awareness of governmental regulations on prices, thus preventing exploitation of information asymmetries).

ICTs can also improve the quality and control of prevention, treatment and care & support programmes which critical components in the long-term management strategy for diseases such as malaria or HIV/AIDS.

ICTs facilitate the monitoring of public expenditures and supports political empowerment to those countries who need to convince their development partners. ICTs are a facilitator through programme coordination and documentation of results which are very important from the point of view of convincing donors to continue funding the programmes.

ICTs surveillance can be used to make an efficient and environmental friendly use of chemicals to enhance agricultural yield or within manufacturing, transport or heavy industry which have high levels of pollution, harming human health and contaminating local environment. Surveillance can also be linked to the exploitation of natural resources to use better natural resources and rationalise the use when there is pressure of globalization on developing countries to exploit their natural resources. ICTs, through satellite observation and networks of sensors can support the protection of existing natural conservation areas such as water resources.

4. ICTs are not a panacea

Due to the existing hype around the potential benefits of ICTs, the high expectations of development communities cannot be met. ICTs alone are not able to change the existing structural, social, political and economic inequalities. Contribution of ICTs to growth will be as an enabler or a tool for other contributors to growth. ICTs should normally be understood as a means to an end, rather than an end in itself.

In relation to poverty, there is no direct and causal relationship between ICTs and poverty reduction. This relationship is much more complex and indirect in nature, whereby the issue of its impact on the livelihoods depends to a large extent on the dynamic and iterative process between people and technology within a specific local, cultural and socio-political context. Frequently, the most immediate and direct effect of ICT programs seems to be the psychological empowerment of people, whereby newly acquired ICT skills provide people with a sense of achievement and pride, thus strengthening their self-esteem.

ICT detractors insist upon the lack of infrastructure support (supporting electricity and telecommunication network), poor internet connectivity, expensive access, lack of skilled and experienced staff for operating ICT systems, inexistence of documentation and communication setup, expensive access, poor utilization skills and few appropriate contents... these arguments may draw a very negative view of the situation, but even then the role of ICTs should be accepted calling for an integrated approach addressing together the above mentioned ICT issues in a holistic approach integrated within other areas of political activity.

5. Complementary actions

For ICTs to contribute effectively to growth, ICT deployment should be accompanied by a holistic view with complementary actions to allow social-economical development to happen. The success of national efforts and the works of international partnerships lie in good governance, driven by investments in ICTs, and shaped by the ability of governments to combat corruption, promote the rule of law and invest in their people. The additional ingredients necessary to make this happen are political will, effective public-private partnerships and demonstrated commitment of all stakeholders.

Legal certainty and the promotion of fundamental and universal human rights are vital, as it is the rule of law establishing democratic institutions and ensuring sound predictable and transparent legal systems which will create sound business environments cutting transaction costs, and empowering local entrepreneurs. Mature macroeconomic conditions will come together and will enable the development of innovative business models offering new opportunities for the widespread of economic and social development through the empowerment of large numbers of poor people.

Public support should aim at achieving two targets. One is partnership with the private sector to extend core infrastructure and promote the technological learning necessary for sustained economic growth. The other is to support investments that complement the private sector activities in the market that normally bypass people living in extreme poverty who cannot afford to pay for basic services. At the same time, corruption has to be combated because it undermines economic development and poverty reduction efforts. It can erode political stability which would exacerbate economic woes and deter local and foreign investments.

Last but not least, governments must systematically holistically consider the gender aspects. Empowerment of women is vital because their lack of education, influence and resources to care for their families and to fully participate in the development process is vital to meet any of the MDG targets. Women's education, work and political status are important, but together with support to self-help initiatives, access to capital for economic enterprise, good salaries and participation.

6. Designing an ICT program

Most of the current Information Society (IS) development programmes start with the deployment of communication infrastructures oriented towards improving access, but adoption is a much more complex issue. Therefore the human development of people, rather than technology itself should be the center of design and evaluation of ICT programs. The important advantage of using this approach is its emphasis on the ability of ICTs to improve the daily livelihoods of communities, in contrast to more conventional approaches which overemphasize the significance of technology itself for social change. Furthermore, evaluations of the impact of ICT programs should focus on an analysis from the vantage point of the people, rather than from the perspective of outside donors or investors. The following are concrete recommendations on the manner in which ICT programs should be designed in order to be most effective on facilitating the empowerment of marginalized groups:

- First, the potential benefits of ICTs are largest when they are being fully integrated into other sectoral development programs (i.e. in education or health). It is, however, important that marginalized communities first identify and define their own needs and development priorities before, in a second step, a project can define whether and how ICTs can support the community's development goals.
- Second, ICT programs are most effective, when combining traditional media with new forms of ICTs. Any program should strengthen traditional information systems, build on existing indigenous knowledge and enhance existing information channels rather than undermine existing structures.
- Third, it is essential that ICT programs prior to initiating any project activities carry out a detailed assessment of existing information flows and information needs. The analysis should focus on how the new technologies can strengthen existing communication and information exchanges within and in between

- communities. The assessment should furthermore identify key ‘information intermediaries’ in the community and analyze existing power relationships as they relate to the transfer of knowledge within the communities.
- Fourth, analyze the process of how ICTs are being introduced. Outside agents or intermediaries may play a key role in supporting communities in appropriating the technologies to meet their own local and cultural needs. Within this process, it is vital that community members gradually gain the skills to make meaningful use of ICTs as well as gradually take ownership of the management of the program.
 - Finally, the most important factors influencing, whether an ICT program has positive outcomes or not are social, political and cultural, while the technical issues involved in the provision of ICTs frequently do not play a key role.

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May 2006

The Expansion of Telecommunications

Ernest Ndukwe, CEO Nigerian Communications Commission

From time immemorial, information and communications have always formed the basis of human existence. This fact has driven humans to continuously seek ways to improve the processing of information and the communication of such information to one another, irrespective of distance and on a real time basis.

The explosion in technology which ushered in the information age has become the basis for defining power in the modern world. It is a widely accepted fact that no modern economy can thrive without an integral information technology and telecommunications infrastructure. The value of products and services is increasingly a function of their information content and the knowledge used to produce them rather than the raw material content. Consequently, the ability to easily access and share information and stimulate the creation of new ideas is viewed as essential to maintaining a strong economy and enhancing quality of life of every citizen.

Access to telecommunications is critical to the development of all aspects of a nation's economy including manufacturing, banking, education, agriculture and government. In fact, recent World Bank studies indicate that for every US\$1 invested in telecommunications infrastructure, more than US\$6 is generated in economic returns by its impact on local employment and general economic growth. Revenue from telecom services alone is estimated at US\$1.2 trillion as at 2002. Telecommunications networks are now making it possible for developing countries to participate in the world economy in ways that simply were not possible in the past.

Telecommunications has been experiencing rapid growth around the world. In 1999, there were 1.4 billion connected lines worldwide (490 million Mobile; 905 million Fixed). Today, there are nearly 3.5 billion lines (1.95 billion Mobile and 1.55 billion Fixed). In fact, to quote an ITU publication, "today, most of the planet's 6.1 billion inhabitants are within reach of telephone service. For the first time in history, there are now more telephone subscribers worldwide than there are households." All these go to demonstrate the importance the world attaches to the development of telecommunications infrastructure.

Increased adoption of ICTs in advanced societies implies that businesses in developing countries will adopt ICTs or become less competitive. New and emerging developing economies are therefore creating the enabling environment to encourage development of ICT infrastructure. Indeed, the developing world is becoming the investment heaven of new business opportunities. In the last four years, three out of four new phone users connected each year live in the developing world and there are ten times more potential internet users in the developing world than in the developed world. Growth in mobile is also mostly generated in developing countries. Between 1993 and 2002, mobile users in developing countries increased from 3 million to over 500 million. For some of these nations, the statistics are staggering. For example, China has added an average of 5

million new mobile phone subscribers every month since 2003. India added 1 million in July 2003 alone and Russia added 1.6 million new mobile subscribers just in the month of August 2003.

Impact of Internet

Communication tools such as telephones and the Internet are increasingly critical to economic success and personal advancement. The advent of the Internet has been variously described as being as important for society as the development of the personal computer, the telephone or even the printing press. The Internet serves many functions – as virtual community, electronic marketplace, information source and entertainment center, among others. Through the Internet, we can create new businesses or facilitate the delivery of basic services such as health and education.

The growth of the Internet is creating opportunities for new high speed data networks, new multimedia applications, Voice over Internet Protocol (Internet Phone) and convergence of technologies.

Video-Conferencing and Multi-Media Facilities

The development of teleconferencing facilities and multi-media capabilities of telecommunications systems has made it possible to combine audio and video facilities, which has been of immense benefit especially in healthcare delivery. It has become common practice for surgeons in one part of the country, or another part of the world, to consult with other specialists while performing operations, and such operations can also be monitored by other surgeons in any part of the world.

Concerning education, telecommunications technology has spurred the growth of distance learning which has given millions of people who lack the time or resources to attend traditional colleges, the chance to pursue education qualifications at their own pace. It has also allowed educational institutions to run courses concurrently, or deliver lectures simultaneously to different groups of students located far away from the actual point of delivery.

Telecommunications and Socio-Economic Activities

Telecommunications brings together buyers and sellers and facilitates the flow of information, making it a key driver of trade. Available data from the International Telecommunications Union has shown that flows of international telephone traffic closely mirror the patterns of international trade. Indeed, variations in telephone traffic can be used as a leading indicator of national economic performance.

In agriculture, easier and faster access to up-to-date market and price information assists farmers and rural-based traders in their businesses. Telecommunications can also deliver better access to information on improved seeds, availability of fertilizers, weather forecasting, pest control and other agricultural-related services.

Furthermore, telecommunications plays an important role in politics and governance, by enhancing a government's ability to provide security for its citizens, protect its borders

and more efficiently handle civil emergencies and national disasters. In turn, the citizens gain easier access to government and greater awareness of government programmes and activities. An informed populace helps protect the democratic process. As expounded by Mr. Jean Jipguep, former Deputy Secretary-General of the ITU “telecommunication is one of the cornerstones of a market democracy. It is no coincidence that dictatorships and totalitarian systems have only ever existed in societies where the penetration of telephone lines is low and where access to information is restricted to the elite.” His observations are certainly backed up by the experience of Nigeria where the rapid growth of Nigeria’s telecommunications’ sector has come about with the advent of a democratic government in 1999.

Nigeria’s Telecom Revolution

Telecommunications technology presents copious opportunities for the creation of unprecedented wealth for Nigeria. Thankfully, the Obasanjo Administration has demonstrated the political will necessary to foster a conducive environment for investment in this sector. Nigeria has progressed from the telecommunications Dark Ages before the year 2000, to a telecommunications revolution that is opening up new possibilities and frontiers across our business, political, social and economic landscape.

In 1999, Nigeria had only 400,000 connected telephone lines and just 25,000 analogue mobile lines. Total teledensity stood at a paltry 0.4 lines per 100 inhabitants. Connection costs were prohibitively high – as much as N60,000 for an analogue mobile line and waiting times for fixed lines could run into years.

Today, owing to several factors including government deregulation policy, the worldwide trend of rapid development in telecommunications and information technology and the huge potential of the Nigerian market, the story is very different. The Obasanjo Administration, through the government regulator, the Nigerian Communications Commission, has proved itself fully committed to the liberalization of the telecom market. Since year 2000, NCC has licensed Digital mobile Service providers, several Private Telephone Operators, Fixed wireless Access Operators, two Long Distance Operators, Internet Service Providers and a Second National Carrier.

This activity has increased and promoted competition in the industry, resulting in exponential growth in the number of telephone lines. It is instructive to note that while connected lines only grew at an average of 10,000 lines per annum in the four decades between independence in 1960 and end of 2000, in the last five years, an average growth rate of 4 million lines per annum was attained. As of September 2006, Nigeria has attained over 26 million lines, (24.5 million of which were digital mobile lines). Total teledensity, which had been just 0.4 lines per 100 inhabitants in 1999 stood at about 21 per 100 inhabitants by September, 2006.

Along with this growth in lines has come a boom in private investment in the telecommunications sector. Recognizing the seemingly insatiable appetite of consumers for phone services and the potential of the Nigerian market, investors pumped in USD8 billion into the sector by 2006. This represents a phenomenal increase in investment from

just USD\$50 million at the end of 1999. Today, investment in the telecom sector ranks second only to that in the oil industry.

Increased competition in the market has also pushed down connection charges, so that fixed lines cost between N7,000-N15,000 in 2003 from over N100,000 in 1999. Although the GSM operators still have some way in terms of tariff rebalancing, the pressure of competition and regulatory and market forces, has forced the more established operators to reduce their rates and also offer per-second billing.

I'm sure that if I interviewed a cross section of the citizens of our country, I would hear countless different stories of how the improved and expanded telecommunications services have touched your lives, families and businesses. The emergence of GSM has led to improvements in efficiency and productivity, reduction in transaction costs, increased service innovation and better quality of life. Over to 10,000 persons have been directly employed by the GSM operators and an estimated 10,000,000 Nigerians are benefiting from indirect employment generated by the GSM operators. Indirect employment has also been created through contract awards to construction firms, research companies and media consultants. In the financial sector, enterprising banks have designed innovative products that leverage the use of GSM.

The emergence of GSM has also led to the return of significant numbers of Nigerians from abroad. These are telecom professionals who have come back to build this country's communications sector instead of giving the best of their talents to foreign companies. Moreover, the GSM explosion has birthed a new class of entrepreneurs who might otherwise have been unemployed. There is a nationwide network of dealers, vendors, GSM accessory sellers and the ubiquitous "umbrella-stand" operators, who actually received a special mention in a recent ITU publication for the service they are rendering to the Nigerian public.

Let's not forget also, the non-quantifiable rewards of improved telecommunications. The use of GSM has resulted in fewer road accidents by reducing the frequency of travel and the lives of many accident victims have been saved because of emergency calls from GSM mobile lines. Last, but certainly not least, the ability to contact our family and friends, both far and near, has been a major benefit for all of us. As a personal example, my mother, Mrs Adaora Ndukwe lives in my village in Oraifite, Anambra State and the only way to contact her is by mobile phone. Knowing that she can call me at any time and that I can reach her, brings me a peace of mind that is invaluable.

The Role of NCC

The progress of the telecom industry in the last three years is largely as a result of the liberalized market, but even in a liberalized environment, government still has a vital role to play in growing the nation's telecommunications infrastructure and ensuring a competitive environment that will reduce prices and make services more affordable. Government best serves the industry through the establishment of a strong regulatory body. The Nigerian Communications Commission has been empowered and mandated to regulate the industry and act as watchdog. The Commission's role is to encourage

competition, remove barriers to market entry, oversee interconnection of new operators with incumbents, monitor tariffs and quality of service, protect consumer rights and ensure the provision of telephone services for all. Our vision is to position Nigeria among the information-rich economies of the world within the next five years. We are also committed to providing the right environment that will attract massive investment into the telecom sector.

We have identified certain key technology areas such as wireless systems and Broadband Internet for particular urgent attention. Digital Wireless and Mobile Communications Systems can help Nigeria leapfrog into the circle of the world's information-rich economies. Nigeria's immediate requirement for local access to the telephone network is enormous and the required capital and time investment needed to complete a full deployment using wire lines are daunting. Wireless systems offer quicker solution to providing network access than traditional copper lines and are therefore more desirable.

Internet services are becoming available even on mobile phones, making it possible to transact a wide range of services formerly only available using a computer device. Fixed and mobile wireless systems offer key advantages in making Broadband and Internet services universally available because of the speed of deployment. Fast deployment means quicker connections to subscribers resulting in faster payback of capital investment. The rapid rate of deployment will also make for faster access to telecommunications facilities and thereby accelerate the pace of national economic development and growth. In very low density and widely dispersed areas, satellite communications systems can fill in the gaps. Satellite systems today can deliver a huge range of services directly to subscribers in remote areas including broadband services necessary for Internet connectivity for distance learning.

Challenges Ahead

Although the benefits of expanded telecommunications infrastructure and Nigeria's achievements in this regard are clear, many challenges remain. For starters, telecommunications is a highly capital-intensive business, requiring massive importation of equipment from abroad and therefore massive funding. Telecom operators had suffered from the timidity of major financial institutions in Nigeria and the lack of access to long-term capital. evidenced by MTN's However, there are signs that the situation is improving. The industry is also held back by the lack of reliable transmission infrastructure in the country which has forced the major mobile operators to divert network access resources to build their own infrastructure and has led them to review their financial and business plans.

Operators also have to contend with inadequate and erratic power supply, poor security and vandalization. Another serious problem is the shortage of trained and qualified manpower. The expansion of our telecommunications facilities must go side by side with the development of the human resource capacity that will support the industry. We must develop our knowledge skills and competencies to understand the complex linkages of wireless networks, fiber optics, satellite systems, computer to computer networks, Internet webs and a host of other telecommunications technologies. Manpower

requirements for telecommunications development does not stop with the engineers and technicians. Nigeria also needs well-trained personnel in other specialist areas such as financial planning, law, accountancy consultancy services, business management, computer science, personnel management and so on.

These challenges are being tackled head-on because Nigeria cannot afford to lose out or fall further behind in the digital world. Nigeria's past economic problems can be partly traced to lack of adequate telecommunications facilities required to support industrialisation and economic growth. Just as access to information and communication services is key to national development, when this access is lacking, national development is retarded.

A troubling divide has grown, separating the world's information "haves" and "have nots". It is arguable that this digital divide – the divide between those with access to new info-communications technologies and those without – poses as many problems and has as far-reaching consequences as the economic gap between First and Third Worlds.

Conclusion

The telecommunications and information technology explosion of the late 1990s is reaching saturation point in the developed world, so attention has shifted to Africa, as one of the last emerging markets. Nigeria must plan for and continue to create the policies and enabling environment to enjoy the full benefits of this new digital opportunity.

With a population of over 120 million people and the country's enormous economic potential, Nigeria remains Africa's most important market. We cannot tap the full potential of this market without a sound telecommunications and information technology base. In the new world order, driven by knowledge and exchange of information and ideas, survival depends on access to national and global information networks. Telecommunications is the infrastructure of the global information society. The expansion of our telecommunications network has and will continue to accelerate development across the nation. In the rural and under-served areas, access to telecommunications will contribute a great deal towards improving education, developing businesses and creating jobs.

Going forward, our challenge is to rapidly grow our telecommunications and information technology networks as a way to emancipate our people and enhance Nigeria's capacity to compete effectively with other economies. Without a solid telecommunications infrastructure the country will not attract the necessary local and foreign investment to build our economy. Telecommunications offers Nigeria the platform to catapult onto a higher developmental plane. The telecommunications revolution witnessed thus far has brought us unprecedented growth in the nation's teledensity, empowerment of the Nigerian populace, respect from the international community, job creation and economic stimulus. However, we still have a lot of work to do to ensure that no Nigerian is left out of the telecom revolution, and all hands must therefore be on deck to improve the nation's socio-economic operating environment. Telecommunications is the key to

unlock the potential of this great nation, and indeed the Continent. The future is very promising and I, for one, feel blessed to be witness to this time in our history.

Part 1: MDGs

Meeting the Millennium Development Goals and the role for ICT

Guido Schmidt-Traub

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About the UN Millennium Project

The UN Millennium Project is an independent advisory body to the United Nations Secretary-General on the Millennium Development Goals. Headed by Professor Jeffrey Sachs of Columbia University, the UN Millennium Project presented a practical strategy for achieving the Millennium Development Goals, *Investing in Development*, to the Secretary-General in January 2005. The Project has been asked to advise on the implementation of its recommendations through to the end of 2006.

In the last decades, the world has seen dramatic progress in poverty reduction and economic growth, notably in South and East Asia as well as other parts of the world. But development progress has been far from uniform across the world, or across dimensions of human development. Many countries and entire regions face stagnating or even rising levels of poverty, hunger, disease, or environmental degradation. Even fast-growing countries are lagging in non-income development outcomes. On current trends many countries will not meet the Millennium Development Goals – a set of internationally agreed Goals to be achieved by 2015. If the Goals are not met, the world will experience more poverty, conflicts, and instability, as well as accelerating environmental degradation. This makes the Goals so important. Fortunately, they remain achievable. By honoring existing commitments to enhanced international partnership, the world can support development anchored in sound national strategies to meet the Millennium Development Goals.

The past decade has also witnessed a dramatic spread of information and communication technologies (ICT) resulting in the near ubiquitous presence of mobile telephony and to a lesser extent the Internet. These technologies have already changes many lives and hold the promise to greatly facilitate the achievement of the Millennium Development Goals. Like in other dimensions of development, however, the “connectivity gap” between rich and poor remains wide. It must be closed with support through national strategies to meet the Goals.

What are the Millennium Development Goals?

The Millennium Development Goals are the world’s shared commitment to addressing extreme poverty in its many dimensions, including hunger, disease, gender inequality, lack of education, poor access to basic infrastructure, and environmental degradation. Anchored in the promise of the Millennium Declaration signed by world leaders in September 2000, and reaffirmed by all countries at the 2005 World Summit, the Goals set specific numerical targets to be achieved by 2015 through a global partnership, with rich countries supporting poor countries through sufficient aid, debt relief, and improved market access. The Millennium Development Goals are ends in themselves, but they are also the means to a productive life, to economic growth, and to peace and stability.

The years remaining until 2015 are barely enough to make the needed investments to halve poverty. The stakes are high. If the Goals are not achieved by 2015, then on current trajectories the world will have failed to save 30 million children from dying before they reach the age of five, to provide 345 million more people with access to basic sanitation who would otherwise lack it, to ensure an adequate food supply for 230 million people who would otherwise be hungry, to ensure equality for women and men, and to ensure a sustainable environment for the coming generation. In addition to the human suffering, the failure to meet the Goals will exacerbate insecurity since extreme poverty is an important driver of conflict. Moreover, environmental degradation will accelerate, further eroding the basis for life on the planet.

Why has Progress towards the Goals been so slow?

In the poorest countries, precious little progress toward the Millennium Development Goals has been achieved. The epicenter of the crisis is Sub-Saharan Africa, where rapidly growing populations are exposed to endemic disease, chronic hunger, rampant illiteracy, environmental degradation, gender inequality, and poor access to basic education and infrastructure. Much of the continent is stagnating, with some countries experiencing regress in key human development indicators, including life expectancy. In other regions, such as Central Asia, Central America, and the Andean region, progress towards the Goals has also lagged substantially.

While there is no single explanation for any individual country's lack of progress, the UN Millennium Project has stressed four separate fundamental causes, some of which can occur simultaneously. One is inadequate governance, when corrupt elites lack the volition to pursue long-term development. In the absence of committed political leadership, respect for human rights and the rule of law, development stalls and it becomes very difficult for the international community to support long-term strategies for achieving the Goals. Many countries with such governance conditions fall into conflict.

A second case occurs when countries are caught in poverty traps. They are governed reasonably well in relation to their income level, but they cannot make the investments in human capital and infrastructure that are required to achieve self-sustaining economic growth. Under the stress of extreme poverty, countries face a higher risk of conflict, for example when failed rains contribute to food scarcity and tensions are heightened. Such countries may face systemic challenges, such as low-productivity agriculture due to adverse agro-ecological conditions, a very high disease burden, adverse transport conditions and large shares of the population living far from the coast, and so forth. Countries in sub-Saharan Africa are most vulnerable to such challenges since the continent experiences a unique combination of agro-ecological, hydrological, and geographic constraints that combine with an extremely high disease burden and poor infrastructure to hinder development.

To break out of the poverty trap, countries require increased public investments focused on overcoming these challenges. For example, the adverse geography of a landlocked country requires investments in improved transport and energy infrastructure, customs facilitation, and transport services. The high disease burden of a country with endemic *falciparum* malaria requires major investments in disease control. Increased investments are also needed to overcome capacity constraints, such as insufficient human resources, or inadequate management systems.

A third situation occurs in countries, including middle-income countries, where progress has been uneven and large parts of an economy or groups in society have been left behind. Such "pockets of poverty" can occur in regions and within cities. In many cases, geographical disadvantages are worsened by the political disempowerment of minority groups. Ending poverty in these communities and regions is possible, but requires high-level political commitment and targeted public investments in people, infrastructure, and environmental management.

Finally, a number of Millennium Development Goals are not being met because policymakers lack awareness on how to proceed or simply neglect core development priorities. A particularly glaring example is maternal health. Many relatively developed countries continue to experience high rates of maternal mortality, even though access to emergency obstetric care could straightforwardly reduce these rates. Likewise, environmental management can be improved and gender biases in public investment and social policies ended if policymakers decide to make these issues priorities.

A Practical Approach to Achieving the Millennium Development Goals

In recognition of these stark challenges and the need to act, UN Secretary-General Kofi Annan commissioned the UN Millennium Project in 2002.¹ Bringing together over 250 development experts from around the world, including scientists, development practitioners, parliamentarians, policymakers, and representatives from civil society, UN agencies, the World Bank, the International Monetary Fund, and the private sector, the Project's ten thematic Task Forces worked for two years to identify the practical actions needed to meet the Goals. They concluded that the knowledge, tools, and resources to achieve the Goals by 2015 already exist. The world knows how to double or triple yields for smallholder farmers in Africa in an environmentally sustainable way; we have the drugs and knowledge to fight HIV/AIDS, malaria, TB, and other killer diseases; the world knows how to improve gender equality by investing in women; and we know how to provide access to water supply and sanitation for everyone. The problem is that these known solutions are not being implemented at a scale to match the ambition of the Millennium Development Goals.

To achieve the Goals, the poorest countries must be empowered to plan around them. Most importantly, countries need to pursue integrated public investment strategies anchored in the MDG targets and time horizons. Across sectors, the 10 Task Forces of the UN Millennium Project identified proven interventions that, when implemented at scale, can be used to meet the Goals. The UN Millennium Project has grouped its recommendations into seven "investment clusters": rural development, urban development, health systems, education, gender equality, environmental sustainability, and science and technology.

Since many interventions address a variety of needs – safe drinking water, for example, is crucial as a target unto itself but also as a critical contributor to child health, girls' education, and gender equality – these investment clusters need to be closely integrated and pursued in parallel. Moreover, they all need to be adequately financed and linked to real budgets. Well-governed but impoverished countries should no longer be forced to choose between the most basic investments in health, education, or clean drinking water due to a lack of resources. This need for integration was recognized by world leaders when they adopted the Millennium Development Goals.

The strong emphasis on the need for public investment derives from the fact that markets alone bypass people living in extreme poverty who cannot afford to pay for basic

¹ The reports of the UN Millennium Project are available at www.unmillenniumproject.org.

services. In addition, markets cannot provide public goods, such as a public health system or rural infrastructure, that have proven critical to generating economic growth in other parts of the world. Without these public investments in infrastructure and human capital, the cost of doing business remains too high for companies to become competitive. Communication technologies are an interesting exception since business models exist that can profitably extend mobile telephony even in poor areas. Still, even here public investments can play an important role in spurring technological change. As pointed out in the 2001 Human Development Report markets are key engines of technical progress, but supplementary public investment will be necessary to make sure that the world's poor can reap the benefits of research and technological diffusion (HDR 2001, p 43).

Of course, investments alone are not sufficient to meet the Millennium Development Goals: effective policies, including sound economic management and business regulation, safeguards against corruption, and measures to end pervasive discrimination against women, are also critical for achieving the Goals. National processes for developing MDG-based development strategies also need to be open and inclusive to empower communities that are too often voiceless and marginalised. Their participation is essential to ensure that the needs and priorities of poor people are adequately addressed in the design and implementation of national strategies.

By taking the Goals seriously as minimum outcomes to be achieved in every country, countries are encouraged to ask a new and powerful question about how to reduce extreme poverty. Instead of asking, as they have in the past, "Given current levels of financing and other constraints, how much development progress can we make?" they are empowered to ask, "What will it take to achieve the Goals in our country?" By flipping this central question, countries can identify constraints and needed investments, enabling the pursuit of ambitious development strategies focused on at least a decade-long horizon.

The Global Partnership for Development

In order to design effective MDG-based development strategies, countries must ask the question, "What level of resources is required to meet the Goals?" To determine an answer, the UN Millennium Project conducted an extensive bottom-up assessment of the investments needed in a cross-section of low-income countries. We found that a typical low-income country like Ghana, Tanzania, or Uganda will need to invest \$75-\$80 per capita in 2006, rising to \$125- \$160 by 2015. Although these investment levels are small, they remain well beyond the means of these countries, where GDP per capita is roughly \$300. To reach the Goals, these countries require annual official development assistance (ODA) of roughly \$60 per capita per year over the coming decade. Global ODA volumes for the Goals need to reach 0.54 per cent of rich countries' national income by 2015. After including other investment priorities that are not directly related to the Millennium Development Goals, such as protecting global fisheries and managing geo-strategic crises, global aid will need to reach the longstanding target of 0.7 per cent of the rich world's income by 2015.

Fortunately, donors have already committed to a major scale-up of ODA. In May 2005, the EU-15 countries set timetables to reach the 0.7 per cent ODA target by 2015. Their announcement means that 16 of the 22 OECD Development Co-Operation Directorate (DAC) donors have made firm commitments to meet the internationally agreed 0.7 target by 2015. This will generate roughly an additional \$35 billion annually in aid by 2010, and \$60 billion in additional annual aid by 2015. Only Australia, Canada, Japan, New Zealand, Switzerland, and the USA have yet to announce such a timeline; together these countries represent much more than half of the rich world's annual economic output. The 2005 G8 summit in Gleneagles committed an additional \$25 billion in ODA for Africa by 2010. Once implemented, this commitment will raise per capita ODA to approximately \$70 by 2010, which is on track towards achieving the aid levels required to meet the Millennium Development Goals.

Of course, these resources will need to be focused on ground-level investments required to achieve the Goals. Today only a quarter of bilateral ODA and less than half of multilateral aid supports such direct investments. The rest is focused on food aid, debt relief, technical cooperation, and other aid not directly related to the Millennium Development Goals. Development assistance also needs to be pooled and harmonized across donors, with a much greater emphasis on budget support wherever possible.

The role of ICT in meeting the Millennium Development Goals

I would like to emphasize four direct channels in which ICT can contribute to the achievement of the Goals, but as this book shows there are many other ways in which modern technologies can promote development. First, ICT can increase the efficiency of social service delivery and raise economic productivity. For example, computer-based procurement systems have been shown to dramatically reduce costs in the health sector. Likewise, modern information technologies can reduce the cost of doing business by raising productivity and lowering the cost of market entry. Second and closely related, ICT create new jobs and entrepreneurial opportunities. Examples include the development, provision, and servicing of ICT equipment and services. By overcoming the cost of distance, countries like India have been successful in creating completely new ICT-based industries, such as call centers and the software sector.

A third channel that is of particular importance to the MDGs is the empowerment of women and communities that may be isolated by virtue of their geographical remoteness or other factors. Grameen Bank has famously introduced the concept of "telephone women" who earn a by renting out the use of mobile phones. Likewise, poor fishermen off the West coast of India use mobile phones to inquire about prevailing market prices before deciding where to land their catch. As a result they have been able to substantially increase living their incomes and reduce income volatility. Similar initiatives exist for farmers in Africa and other parts of the world.

Fourth, ICT facilitates the monitoring of public expenditures and supports political empowerment. By computerizing public expenditure tracking systems the monitoring of financial flows can be improved. This is of course particularly important for poor countries that require increased development assistance to meet the Goals and therefore

need to convince their development partners that they can fully account for external financing. Modern communication technologies, such as low-cost radio stations and the internet, have given rise to a vibrant media and support civil society organizations even in the poorest countries. As a result, public scrutiny of policies and budgets, an important check on executive authority, has markedly increased in recent years.

To effectively deploy ICT for development countries need to partner with the private sector to extend core infrastructure and promote the technological learning necessary for sustained economic growth. Of paramount importance are good regulatory frameworks that encourage competition and lower the cost of market entry for companies. Many developing countries still depend heavily on revenues from state-owned telephone monopolies and have therefore been reluctant to liberalize this critical market. Experiences so far suggest that liberalizing the telecommunication market can yield tremendous benefits to countries – regardless of their stage of development. Possible repercussions of liberalization on governments’ budgets must of course be factored into medium-term expenditure frameworks.

However, in some instances good policies and regulatory frameworks also need to be accompanied by public investments that complement private sector activities. This important point was emphasized in the 2005 Tunis Agenda of the World Summit on the Information Society, which stressed the need for investments to expand capacity building efforts for ICT, to extend the benefits of ICT to remote areas or “areas that present technological and market challenges”, to create regional infrastructure, and to extend the application of ICT to development strategies in other sectors (Tunis Agenda for the Information Society, Paragraph 23). Likewise, the UK’s Commission for Africa included ICT in its proposed \$10 billion infrastructure investment strategy. (Commission for Africa, p. 233).

The need to act now

In September 2005 all 191 UN member states that were represented at the World Summit agreed to adopt and implement by 2006 ambitious national development strategies anchored in the targets and time horizon of the Millennium Development Goals. Such strategies need to form the fulcrum of international support, with UN partners, the World Bank and the International Monetary Fund providing technical advice to ensure governments are putting forward the best possible MDG-based strategies. If each national strategy outlines the maximum efforts that a developing country itself can make towards the Goals, including the maximum domestic resources that can be mobilized, then donor countries must fill the gap of support required to achieve the Goals. This is particularly important for the poorest countries that have very few resources available.

Additionally, UN member states resolved at the World Summit to launch several “Quick Impact Initiatives” that can be implemented immediately and have enormous benefits on millions of lives within two to three years. The world should move quickly to launch such Quick Impact Initiatives as a global initiative to fight malaria through mass-distribution of insecticide-treated bed nets and artemisinin-based combination therapy; a campaign against hunger focusing on school meals using locally produced food; supporting in each

country the establishment of an office of national science advisor; and the abolition of user fees for basic healthcare and primary education, backed by increased development assistance to make up for the revenue shortfall. Success on each of these Quick Impact Initiatives will require developed and developing countries to work closely together in the months ahead. They must mobilize the needed resources and move to implement as quickly as possible.

National strategies need to be adopted by developed countries as well. For these countries, strategies will focus particularly on the eighth Millennium Development Goal, which outlines a global partnership for development, including target 18: “In cooperation with the private sector, make available the benefits of new technologies, especially information and communication.” Nowhere is the test of this Goal more meaningful than at the level of supporting developing countries’ national strategies to achieve the Millennium Development Goals. It is incumbent upon the developed world to support these programs. Indeed, any country that puts forward a rigorous and monitorable investment plan for the Goals should be immediately “fast-tracked” and given adequate financial support.

The coming months offer a rare opportunity of a breakthrough towards conquering extreme poverty. Achieving the Goals is the most pressing political imperative of our time. With decisive leadership and a clear focus on implementation, extreme poverty can be halved within a decade. At issue is a simple choice of whether to follow through on commitments. The right choice must be made at all levels, and a new decade of bold and practical ambition must be launched. The stakes could not be higher. Tens of millions of lives depend on it.

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Human rights, Millennium Development Goals and ICTs

Building bridges between human rights law and human development in Nigeria -
Enabling meaningful participation through equal access to new technologies²

Beatriz Fernández Carrillo

Beatriz Fernández Carrillo joined Global Rights in February 2006 as a Program Associate for the Initiative Against Trafficking in Persons. Beatriz is from Spain and she holds a law degree, a master's degree in development and a master's degree in international legal studies. In 1999 Beatriz worked as Trade Officer for the Chamber of Commerce of Madrid and was assigned to Bogotá, Colombia. In 2000-2002, she coordinated projects at Fundación ANAR, a Spanish foundation focusing on children. In 2002, she worked for Save the Children - Spain in Morocco where she managed a project for disabled children in Tetuan, mobilizing resources and networking with community leaders. From August 2002 to July 2004, she worked with the United Nations Development Programme as a United Nations Volunteer, coordinating the Programme in the Philippines. Beatriz was awarded a Fulbright scholarship in 2004 to study in the U.S.

² The limited extension of this contribution does not allow for addressing important issues related to human rights and Millennium Development Goals such as accountability-based monitoring processes, the aspect of transitional justice or the role of private actors. Rather, this chapter attempts to stress the importance of applying the guidelines and recommendations that have already been laid out by the Special Adviser to the UN High Commissioner for Human Rights on the Millennium Development Goals and the UN Millennium Project Report 2005. It particularly focuses on the issue of participation and the use of new technologies. The main purpose of this contribution is to generate understanding among groups engaged in pursuing human development in Nigeria on the need to mainstream human rights in domestic laws, policies, development programs and operations towards the achievement of the Millennium Development Goals.

Introduction

After thirteen years and despite efforts to invoke the respect for economic, social and cultural rights, the oft-quoted statement of the UN Committee on Economic, Social and Cultural Rights at the Vienna World Conference on Human Rights³ still holds true in 2006:

*'[T]he shocking reality . . . that States and the international community as a whole continue to tolerate all too often breaches of economic, social and cultural rights which, if they occurred in relation to civil and political rights, would provoke expressions of horror and outrage and would lead to concerted calls for immediate remedial action. In effect, despite the rhetoric, violations of civil and political rights continue to be treated as though they were far more serious, and more patently intolerable, than massive and direct denials of economic, social and cultural rights'*⁴

A strong disconnection between human rights and the development community has been limiting and still limits today the effectiveness of advocacy work and policy reform towards equitable human development in many countries⁵. There are many reasons for why this is so, but an important component for this disruption is the contested legal nature of economic and social rights, along with concerns about their enforcement⁶. It has been argued that socio economic rights should only be addressed in the realm of politics. Under this thesis, socioeconomic equality is attainable through the fulfillment of civil and political rights. One counter to this thesis is to consider the person who is deprived of the most necessary elements for survival, and the difficulty he/she has in exercising civil and political rights. At this juncture, individuals whose rights are continually abused have only three alternatives: to claim their socioeconomic rights and obtain redress from governmental, judicial or quasi-judicial bodies; to rebel against the system with the risk of recurring violence; and to accept the 'status quo' of deprivation. Most people continue to be deprived of their fundamental rights and transmit this same deprivation to their children. Fortunately, however, the relevance of socioeconomic rights has increased in a significant manner. It is obvious that the only alternative to the rule of law is the 'rule of the strongest' and it is well known who are among the weakest segments of the population in this equation.

³ 'In 1989 the UN General Assembly called for the convening of a world meeting that would review and assess progress made in the field of human rights since the adoption of the Universal Declaration of Human Rights...The Conference agenda ... included the examination of the link between development, democracy and economic, social, cultural, civil and political rights...', at <http://www.unhchr.ch/html/menu5/wchr.htm>

⁴ UN Committee on Economic, Social and Cultural Rights oft-quoted statement to the Vienna World Conference in 1993, UN Doc. E/1993/22, Annex III, p. 5., at Philip Alston, *A Human Rights Perspective on the Millennium Development Goals, (Paper prepared as a contribution to the work of the Millennium Project Task Force on Poverty and Economic Development)*.

⁵ See Philip Alston & Mary Robinson, *Human Rights and Development – Towards Mutual Reinforcement* (Oxford University Press, 2005); Peter Uvin, *Aiding Violence: The Development Enterprise in Rwanda* (Kumarian Press, 1998) and *Human Rights and Development* (Kumarian Press, 2004).

⁶ Part of these concerns refers to the dramatic implications of enforcing socioeconomic rights, redistribution of resources being the most obvious one. Elites of many countries and entire political systems of other countries continue to oppose to any suggestion of conditioning or regulating the market.

Today Nigeria is one country that best exemplifies the formidable challenge to fulfilling the two sets of rights -economic, social and cultural rights; and civil and political rights- with the achievement of the Millennium Development Goals by 2015. A land extraordinarily rich in natural and human resources, Nigeria is still one of the poorest countries in the world⁷. Since the 1990s, the Niger Delta region has experienced great turmoil and violence. The lack of respect for the economic, social and cultural rights of the people living in the Niger Delta accompanied by the number of unfinished or unsuccessful development programs continue to fuel frustration and tension in the communities⁸. In spite of this, the beginning of a democratic era, a vibrant young civil society, and the leading role of the Nigerian government in the African Union offer unique opportunities for the country and for the West African region.

From the Vienna Declaration to the Millennium Declaration – Building Bridges in the International Arena

On June, 25, 1993, national authorities at the World Conference on Human Rights adopted the Vienna Declaration and Plan of Action recognizing that all human rights (social, cultural, civil, economic and political rights) are universal, indivisible, interdependent and interrelated. The government representatives also stated that the international community has the obligation to consider all human rights equally while simultaneously considering the cultural differences and backgrounds⁹ associated with different countries. Notwithstanding the complicated consensus that occurred at the Conference, the 1993 Vienna Declaration served to consolidate a basic level of consensus reached at the Universal Declaration of Human Rights. Particularly, the principle of indivisibility of rights - civil, economic, political, social or cultural- is crucial to understand recent developments in human rights and their intersection with development cooperation.

Previously, the codification of socioeconomic rights in the International Covenant on Economic, Social and Cultural Rights (ICESCR, 1966)¹⁰ had meant that socioeconomic grievances would no longer belong exclusively to the realm of politics and economics, but also to the international legal structure as a concern of the entire global community. Article 2.1 of the ICESCR makes explicit reference to international cooperation when

⁷ Approximately 90% of the population survives on less than \$2.00 a day. Nigeria is in the bottom quartile of the Human Development Index ranking 158. The population of Nigeria is more than 125 million people, the largest in Africa. See UNDP Human Development Report 2005.

⁸ The African Commission on Human and Peoples' Rights found in 2001 that Nigeria committed human rights abuses in violation of the African Charter in connection to oil operations in Ogoniland in the Delta. *The Social and Economic Rights Action Center for Economic and Social Rights v. Nigeria*, African Commission on Human and Peoples' Rights, Comm. No. 155/96 (2001). See also BBC, By Alex Last, BBC, Niger Delta, *Nigeria's oil hope and despair*, available at: http://news.bbc.co.uk/2/hi/programmes/from_our_own_correspondent/4700588.stm; see also Amnesty International reports: *Nigeria, ten years on: Injustice and violence haunt the oil Delta*, 2005; *Claiming rights and resources – Injustice, oil and violence in Nigeria*, 2005; *Are human rights in the pipeline?*, 2004.

⁹ Vienna Declaration and Programme of Action, A/CONF.157/23, 12 July 1993, para. 5.

¹⁰ The International Covenant on Economic, Social and Cultural Rights was adopted in 1966 and entered into force in 1977; it has been ratified by 148 States.

addressing the nature of obligations contracted by States parties. Article 2.1 portrays the sense of shared responsibility and global accountability stemming from the principle of universality as reaffirmed in the Vienna Declaration¹¹. This understanding would be later reflected in the Eighth Millennium Development Goal: Partnership for Development, which underscores the crucial role that international cooperation must play in achieving the rest of the Goals.

Seven years after the Vienna Declaration, the General Assembly adopted the Millennium Declaration¹². The heads of States and governments recognized that they have "...a collective responsibility to uphold the principles of human dignity, equality and equity at the global level." The Declaration underlines globalization's challenges and opportunities as well as the need to uphold the principles of freedom, equality, solidarity, tolerance, respect for nature, and shared responsibility. Although the Millennium Declaration is not directly binding to States, the Special Adviser to the UN High Commissioner for Human Rights on the Millennium Development Goals has argued that at least some Millennium Development Goals can be considered customary norms¹³.

The Millennium Declaration laid out specific goals some of which were later framed as the Millennium Development Goals (MDGs) in the Millennium Project¹⁴. Although the Millennium Declaration included one specific section devoted to human rights, democracy and good governance¹⁵, none of the eight Goals are framed as the fulfillment of one or various rights. In this sense, it can be said that the Millennium Project has set up an agenda with no conceptual framework. Nevertheless, many of the Goals do touch upon essential components of socioeconomic rights as they refer, for instance, to basic standards of living, health and education. Particularly, the case of MDG2, whereby achieving primary universal education clearly embodies the right to education¹⁶. On the other hand, the Millennium Declaration did lay out a framework constructed upon the resolution '...to strive for the full protection and promotion in all our countries of civil, political, economic, social and cultural rights for all.'¹⁷ In this light, the UN Development Group has considered human rights a cross cutting issue and has fostered

¹¹ IECSR, Article 2: 1. Each State Party to the present Covenant undertakes to take steps, individually and through international assistance and co-operation [...] to the maximum of its available resources, with a view to achieving progressively the full realization of the rights recognized in the present Covenant by all appropriate means... See also General Comment No. 31 on Article 2, The Nature of the General Legal Obligation Imposed on States Parties to the Covenant (adopted on 29 March 2004), UN doc. HRI/GEN/1/Rev.6 (2003).

¹² United Nations Millennium Declaration, General Assembly resolution 55/2 of 8 September 2000.

¹³ Philip Alston, *A Human Rights Perspective on the Millennium Development Goals*, (Paper prepared as a contribution to the work of the Millennium Project Task Force on Poverty and Economic Development), para. 40.

¹⁴ These Goals have been reaffirmed in successive summits like the Johannesburg World Summit on Sustainable Development and the Monterrey Consensus, available at <http://www.un.org/millenniumgoals/>

¹⁵ Millennium Declaration, V. Human rights, democracy and good governance.

¹⁶ The right to education is recognized in the Convention on the Rights of the Child that have been ratified by all the States with the exception of the United States and Somalia.

¹⁷ Millennium Declaration, para. 4 and section V of 'Human rights, democracy and good governance' (para. 24 and 25), at <http://www.ohchr.org/english/law/millennium.htm>

the adoption of a human rights-based approach in development and poverty reduction strategies¹⁸.

The UN Millennium Project Report 2005¹⁹ states that the MDGs are ‘also basic human rights—the rights of each person on the planet to health, education, shelter, and security as pledged in the Universal Declaration of Human Rights and the UN Millennium Declaration²⁰.’ The Report acknowledges that ‘... a human rights framework is an essential prerequisite to achieving all the Goals. But there has been no systematic effort to integrate development planning with a human rights framework, even though such integration has tremendous potential and relevance²¹.’ It is yet to be seen if the results garnered from human rights-based approaches to development will be utilized in practice and whether other international organizations, donors and NGOs will be encouraged to follow suit. In any case, the new impetus for coordination stemming from donor’s commitment to increase the Official Development Aid and enhance effectiveness in development has so far triggered efforts to simplify and harmonize only certain areas that are mostly operational. At the country level, Poverty Reduction Strategy Papers, United Nations Development Assistance Frameworks and country assessments processes continue to be independent documents with no common references to human rights or, in some cases, even MDGs²².

MDGs and Fulfillment of Human Rights Obligations in Nigeria

Nigeria is bound by international human rights obligations contained in international treaties that it has willingly ratified. Unlike many other countries, Nigeria has never made any declaration or reservation to the above treaties. Contrary to the view that human rights are internationally imposed concepts, Nigeria has had discretionary powers to assume human rights obligations, as has been the case of other sovereign states. Many of the internationally recognized rights have also been incorporated into the Nigerian Constitution.

Nigeria has ratified the International Convention on the Elimination of All Forms of Racial Discrimination, on October 16, 1967; the International Covenant on Civil and Political Rights (ICCPR) and the International Covenant on Economic, Social and Cultural Rights on July 29, 1993; the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (CAT), on June 28, 2001; the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), on July 13, 1985 and its Protocol, on Nov 22, 2004; the Convention on the Rights of the Child (CRC), on April 19, 1991; the African Charter on Human and Peoples’ Rights (African Charter), which Nigeria ratified in 1983 and has incorporated into domestic law; and the African Charter on the Rights and Welfare of the Child (ACRWC), on July 23, 2001; the Rome Statute of the International Criminal Court on September 27, 2001 and the eight ILO Labor Conventions: Freedom of association Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87); Right to Organize

¹⁸ UNDG Policy Network on the MDGs available at <http://www.undg.org/content.cfm?id=1353>; ‘The Human Rights Based Approach to Development Cooperation: Towards a Common Understanding Among the UN Agencies’, 2003, available at <http://www.undg.org/content.cfm?id=14>.

¹⁹ UN Millennium Project 2005. *Investing in Development: A Practical Plan to Achieve the Millennium Development Goals*.

²⁰ *Ibid.*, p. 1.

²¹ *Ibid.*, p. 118.

²² See below case of Nigeria.

and Collective Bargaining Convention, 1949 (No. 98); The abolition of forced labour Forced Labour Convention, 1930 (No. 29); Abolition of Forced Labour Convention, 1957 (No. 105); Equality Discrimination (Employment and Occupation) Convention, 1958 (No. 111); Equal Remuneration Convention, 1951 (No. 100); The elimination of child labour Minimum Age Convention, 1973 (No. 138); and Worst Forms of Child Labour Convention, 1999 (No. 182).

In addition, Nigeria has human rights obligations stemming from customary international law. The International Court of Justice has considered the prohibition of genocide, protection from slavery and racial discrimination to be customary norms. This list has been recently expanded to include the murder or causing the disappearance of individuals, torture, prolonged arbitrary detention or a consistent pattern of gross violations of internationally recognized human rights.

The Nigerian Constitution, Chapter IV, recognizes the right to life; the right to human dignity, including the prohibition of torture or inhuman or degrading treatment, slavery or servitude, and forced or compulsory labor; the right to personal liberty; the right to fair hearing; the right to a private and family life; the right to freedom of thought, conscience and religion; the right to freedom of expression and the press; the right to peaceful assembly and association; the right to freedom of movement; the right to freedom from discrimination; and the right to acquire and own immovable property.

According to the Nigeria Millennium Development Goals Report 2004²³, Nigeria is still very far from eradicating extreme poverty and hunger, reducing child mortality, improving maternal health and combating HIV/AIDS. On the positive side, there are chances of achieving the Goal of primary education (and therefore, fulfilling the right to education); ensuring environmental stability (with implications to the right to health and right to life); and a global partnership for development (MDG8). It is also probable that Nigeria will eliminate gender disparity in primary and secondary school. The major difficulty has been to produce and keep track of information for monitoring purposes, especially with regard to Goal 1: poverty alleviation.

It is interesting to point out that while the Nigeria Millennium Development Goals Report 2004 does not contain language discussing rights, the National Economic Empowerment and Development Strategy (NEEDS) for 2003 – 2007²⁴ includes numerous references to civil, political but also socioeconomic rights. The NEEDS clearly states “that every Nigerian has the right to adequate water and sanitation, nutrition, clothing, shelter, basic education, and health care, as well as physical security and the means of making a living²⁵.” The NEEDS also recognizes the necessity of implementing a human rights-based approach to development: “The challenge is not only to reform the economy in order to boost economic growth but also to empower the people as a means of revitalizing the weakened social pillar. Doing so calls for a human rights approach to

²³ National Millennium Development Goals, Report 2004 - Nigeria, available at www.undp.org/ng/MDG_Report.htm; the National Millennium Development Goals Report 2005 has been recently launched and will be available at www.undp.org/ng

²⁴ *Meeting Everybody's Needs*, National Economic Empowerment and Development Strategy, Nigerian National Planning Commission, available at <http://www.imf.org/external/pubs/ft/scr/2005/cr05433.pdf>

²⁵ *Ibid.*, p. xv

development planning that places people at the centre of development efforts. The added value provided by this approach is that the norms and values enshrined in it have the potential to empower the poor. This is important, because it is now widely recognized that effective poverty reduction is not possible without doing so²⁶.”

Operationalization of human rights to achieve the MDGs

To put human rights, it is essential to both understand the concepts of non-discrimination and equality²⁷ and fashion tools to operationalize them. These two concepts are crucial because they enshrine the idea that all human beings have equal dignity and that this sense of dignity entails the capacity to guide personal development in the form that each individual freely decides. Since the potential of human development is still unknown, freedom and liberties should precisely aim to provide the space for individuals to formulate their own path; this and no other is the meaning of the right to development²⁸, both at the individual and collective level.

The right to development is strongly connected to human rights – based approaches to development programming. Such approaches seek equitable development and that aspect would be already a good argument to promote their use. As mentioned before, MDGs were conceived under the respect of principles such as the principle of equality. But even if equitable or fair development are terms that are not yet comfortably accepted by the development community due to their vagueness and broadness, the need for more *effective* development action is clearly understood and repeatedly asserted by donors, governments and development actors. The MDGs has brought a sense of urgency to this call for effectiveness. On this point, human rights – based approaches can play a fundamental role since nothing is more powerful than the rights language; nothing mobilizes people more effectively than the awareness of their rights-holder condition.

Former UN High Commissioner for Human Rights, Mary Robinson, defined the human rights - based approach to development as: ‘. . . a conceptual framework for the process of human development that is normatively based on international human rights standards and operationally directed to promoting and protecting human rights. The rights-based approach integrates the norms, standards and principles of the international human rights system into the plans, policies and processes of development. The norms and standards are those contained in the wealth of international treaties and declarations.’²⁹ Its main principles are empowerment, accountability, non-discrimination and participation (as many development practitioners have consistently argued: *meaningful* participation).³⁰

²⁶ *Ibid.*, p. 28

²⁷ Although the conceptualization of equality and non discrimination appears not to present major difficulties, one of the recurrent mistakes in development work is to take things (and particularly values) for granted. Only recently development practitioners have started to acknowledge the need to better understand the meaning of equality and equity in development; see World Bank Report 2006, *Equity and Development*.

²⁸ Declaration on the Right to Development, adopted by General Assembly resolution 41/128 of 4 December 1986.

²⁹ Mary Robison at the Presidential Fellows’ Lecture, World Bank, 2004.

³⁰ See supra 17.

Ensuring meaningful participation, particularly at the grass roots, is a guarantee to avoid exclusion and denial of rights. Participation may be envisioned in two different ways: as an operational principle and as a human right. As a principle, it should be applied to specific initiatives and programs to achieve the MDGs: participation of communities and groups in consultations, women's access to managerial positions, etc. In this case, the principle of participation is more ambiguous, yet it may result more formal and limited in its overall impact. On the other hand, participation is a right contemplated in international declarations and treaties like the International Covenant on Civil and Political Rights³¹. It is moreover a right where the principle of indivisibility acquires full meaning as it clearly needs to be complemented by other rights, such as freedom of expression or freedom of association. In the first facet, pursuing participation can be more meaningful and effective as it relates to the country's entire legal and judicial structure. Thus, the promotion of the right to participation can advance strategic reforms towards the achievement of the MDGs.

In either instance both participation as an operational principle and as a right can and should reinforce each other. Also, only from an integrated approach to participation it is possible to understand the complicated issues that arise when trying to guarantee inclusion through participation. One of the problems of ensuring inclusion may derive from the fact that rights are not obligations. Even if governmental officials or development practitioners try by all means to promote the participation of women in a given activity, a significant number of women may not wish to exercise their right. Strong cultural differences cannot be overlooked and made disappear in a limited number of years. Second, stakeholders may participate willingly and actively; their participation, however, does not necessarily translate into an effective and positive outcome for participants. This is perhaps the reason why some local organizations like Oxfam GB have started to coin the 'right to be heard'.³²

Therefore, any action to achieve the MDG should include a strategy that considers and defines meaningful participation as well as other rights involved. The NEEDS calls for a human rights – based approach to development but it should also recommend a strategy to implement such approach with a clear definition, description and prioritization of issues. In the case of Nigeria, it is important to take into consideration the baseline and the actual situation of respect for rights. For instance, in spite of the existence of a vibrant civil society in the country, the chances for meaningful participation—at least through traditional channels—appear to be quite low. Even though the Constitution recognizes the right to belong to trade unions and association, many statutory restrictions remain in place. The Nigeria Labor Congress reported that only four million people were affiliated with trade unions, which is less than 10% of the total number of workers. Some organizations and trade unions met restrictions to register and operate as legal entities.

³¹ See also Article 25 of the Universal Declaration of Human Rights stating that 'Every citizen shall have the right and the opportunity, [without discrimination] and without unreasonable restrictions: (a) to take part in the conduct of public affairs, directly or through freely chosen representatives ...'

³² United Nations Office of the High Commissioner for Human Rights, Upala Devi Banerjee, *Lessons Learned From Rights-Based Approaches in the Asia-Pacific Region, Documentation of Case Studies, 2005*, at pp. 201, 207, 210 & 216.

The ILO Committee of Experts on the Application of Conventions has inquired about the steps needed to eliminate the restrictions to exercise freedom of association. The International Confederation of Free Trade Unions (ICFTU) has stressed the need to take measures “in view of serious restrictions on the trade union rights of workers in Nigeria, discrimination, child labour and forced labour [...] to comply with the commitments Nigeria accepted at Singapore, Geneva and Doha in the WTO Ministerial Declarations over 1996-2001, and in the ILO Declaration on Fundamental Principles and Rights at Work.”³³

Meaningful participation and new technologies

The Millennium Declaration states the need to “ensure that the benefits of new technologies, especially information and communication technologies, in conformity with recommendations contained in the ECOSOC 2000 Ministerial Declaration, are available to all.”³⁴ Information and communication technologies (ICTs) offer an entire new range of opportunities for freedom of expression and for the realization of the right to participation. ICTs are becoming a key component of advocacy strategies, networking or peace negotiations³⁵.

Even though most African rural areas do not have electricity or running water, the internet is slowly entering even the poorest African regions. Television and radio continue to be the main venues of communication amongst rural Africans; however, younger generations are now starting to reap the benefits of internet technologies. Nigeria already has already documented a few hundred bloggers who freely express their ideas and claim their rights. The Nigerian government, aware of the benefits of ICTs for development and the serious consequences of being left behind in the area of new technologies, is taking initiative and building upon a National Information Technology policy of 2001. The government has recently set up the National Information Technology Development Agency (NITDA) to coordinate and implement the policy.³⁶

ICTs can be addressed as a goal in itself through specific initiatives targeting to improve access to new technologies. It can also be articulated as a tool to enhance the principle of meaningful participation under human rights-based approaches to development. Nevertheless, as a powerful instrument, ICTs can also serve for ill purposes and contribute to power capture at the national and the local level. The need to ‘bridge the digital divide’, which has traditionally pertained to differences between countries and regions, also applies to population groups and urban and rural areas within countries. In

³³ International Confederation of Free Trade Unions (ICFTU), *Internationally Recognised Core Labour Standards in Nigeria, Report for the WTO General Council Review of the Trade Policies of Nigeria* (Geneva, 11 and 13 May 2005), available at <http://www.eldis.org/cf/search/disp/docdisplay.cfm?doc=DOC18926&resource=fl>.

³⁴ UN Millennium Declaration, General Assembly Res. 55/2 (2000), at p. 20.

³⁵ African Rebels Take Their Battles Online, Internet Extends Political Debate By Emily Wax Washington Post Foreign Service, Saturday, January 14, 2006; A16

³⁶ Chike Onwuegbuchi, Daily Champion (Lagos) All Africa.com News, February 23, 2006, “According to International Telecommunication Union (ITU), the level of Information Technology remains low in the country, as the nation's Personal Computer (PC) penetration is at an abysmal low rate of seven per 1,000 inhabitants”, available at <http://allafrica.com/stories/printable/200602230209.html>

Nigeria, like in many other countries in the world, ICTs do not reach some populations who have traditionally suffered exclusion. As women constitute the majority of the rural poor population, it is not difficult to deduce their omission. Two main obstacles for women to benefit from new technologies are precisely where ICTs could contribute most: an unrealized right to education as well as an inability to access information. Cultural factors also undermine the chances that women may have to benefit from ICTs because their access to public points is more limited than their male peers.

On the other hand, corruption and capture of power and resources exist at all levels, from central governments to local councils, and in most countries with different degrees. Too often the result of development investment, particularly the disbursement of significant amounts of funds in a given area, results in more harm than good. It may produce more accumulation of resources and greater inequality. This is particularly true when the project or program has been poorly designed or monitored. The risk of ‘development collateral damage’ also exists in programs promoting ICTs. Moreover, the risks involved may be even greater in ICTs initiatives since ICTs enhance the acquisition of information and specialized knowledge in an extraordinary way. In other words, it makes the bridge between the wealthy and the poor even more significant and overwhelming. When the principle of equality and non-discrimination has not improved peoples’ ability to access new technologies and when no affirmative action is taken to encourage the access by those who have been traditionally excluded, new technologies can actually contribute to maintain the status quo of power and abuse.

In order to avoid the above, ICTs strategies should be integrated as a reinforcing component of human rights-based programs, or conceptualized and planned under a human rights-based approach to development programming and management that sets specific operational guidelines. Such approach necessarily entails a slow pace through careful, thoughtful and accountability-based management.

In short, ICTs are a fundamental tool to achieve basic principles embodied in the Millennium Declaration and in human rights treaties. The implementation of effective ICTs rural strategies for poor women would greatly contribute to the achievement of MDG 2 - primary universal education- and MDG 3 –gender equality. But ICTs could also be instrumental in achieving the rest of the Goals by reinforcing the operational principle of meaningful participation in human rights-based approaches to development programming. Increasing rural women’s access to ICTs would contribute to fulfilling their human rights, namely the right to education and the right to take part in public affairs. Lastly, ICTs would be crucial to promote women’s right to development, which includes greater autonomy and choices towards personal growth and transformation, expanding women’s sense of empowerment and dignity.

MDG1: ICT and Poverty: ICTS, means or ends?

Rawaa Al-Saadi

Rawaa graduated from Damascus University, Faculty of Civil Engineering with a Bachelor of Science in Environmental Engineering to start her professional career in Damascus/Syria as an environmental engineer working on international environmental projects funded by the European Union and the Swedish International Development Cooperation Agency (SIDA). Having been selected as a Fulbright scholar, she moved to the United States to pursue her studies in water resources management in Texas Tech University. After earning her Masters of Science in Civil Engineering/Water Resources Management, she received the Dean's scholarship to pursue her Ph.D. at Texas Tech University. Rawaa worked on a diverse spectrum of activities that went beyond her technical field and was elected as the Vice President of the Arab Students Association and the Public Relations Counselor of the Muslim Student Association. Her activities also included working with the Cultural Diversity Committee at Texas Tech. While a Ph.D. Candidate, she came back home (Damascus) and worked as a UNDP consultant in one of the largest projects related to integrated water resources management in Syria. Latter, Rawaa joined the UNDP to work in their Programme Section as a consultant. Her responsibilities included establishing cross-sectoral partnerships and, initiating and coordinating the activities of the Global Environment Facility Small Grants Programme (GEF/SGP) that is aimed at supporting grass-roots initiatives implemented by local communities. Rawaa has been appointed as the National Coordinator of the GEF/Small Grants Programme in Syria. She is responsible for the overall management and direction of the UNDP GEF/SGP in Syria.

Abstract

With the present focus on the Millennium Development Goals (MDGs) and the continuing uncertainty and confusion on the role that ICTs can play in achieving them, it is now a matter of immediate urgency that decision makers form a more precise understanding of the relationship between ICT and development, especially poverty reduction.

The extent to which the world is off track to achieve most of the Millennium Development Goals MDGs, globally and in most regions and countries (UNDP, 2003; UN Statistics Division, 2004), is but an evidence that the progress in reducing poverty as one of the core objectives of international development remains disappointing. The inadequate progress raises important questions about the policies and strategies adopted to achieve poverty reduction, particularly those centered around economic growth. It also raises important questions about the very conception and understanding of poverty. Although the multidimensional nature of poverty has been recognized, the existing understanding of poverty dynamic in general is still narrow.

Decades of experience with the use of information and communication technologies ICTs indicate that whilst ICTs are essential to achieve significant improvements in the wellbeing of societies, there is a need to fully come to terms with the reality that ICTs are not the cure and remedy to poverty. ICTs are means to an end but never an end by themselves.

In this paper, three approaches to defining and measuring poverty—the monetary, capability and social exclusion—are reviewed. Role of ICTs in reducing poverty as defined by the three approaches is analyzed reflecting the multifaceted nature of both poverty itself as well as the variety of conditions that are required for ICTs to have their optimal impact.

1. Understanding Poverty: The Different Approaches to Defining Poverty

Halving poverty by 2015 is the central objective of the Millennium Goals that were agreed by 149 countries at the UN Millennium Summit in New York. The elimination of poverty is currently providing the main justification for promoting economic growth and development. Ironically while the objective of poverty reduction is being used as the parameter in assessing almost every policy, there is increasing debate about *what is poverty*.

The United Nations identified poverty as follows: “**Fundamentally, poverty is a denial of choices and opportunities, a violation of human dignity. It means lack of basic capacity to participate effectively in society. It means not having enough to feed and cloth a family, not having a school or clinic to go to, not having the land on which to grow one’s food or a job to earn one’s living, not having access to credit. It means insecurity, powerlessness and exclusion of individuals, households and communities. It means**

susceptibility to violence, and it often implies living on marginal or fragile environments, without access to clean water or sanitation.”

And while the above definition is holistic and comprehensive, in practical terms it does not give a clear guidance on how to identify the poor. In order to devise policies and to ensure that tools such as the ICTs are positioned where they can effectively make a difference in reducing poverty, it is important to know who are the poor. Currently, the approach to identifying poverty is contradictory. On the one hand, there is acknowledgement of its multidimensionality with little consistency across studies and reports. On the other hand, in practice, the monetary approach retains its dominance in descriptions and analysis. Clarification of how poverty is defined is extremely important in identifying who are the poor and thus, using different solutions for poverty reduction. Differences in identifying poverty stem from two underlying fundamental issues that are *space* and *universality*. For any chosen space, poverty has a “sphere of concerns” which is sometimes confined to material aspects of life, or include social, cultural and political aspects. Universality of the definition of poverty is questioned. Approaches devised for one type of society might not be transferable to other societies without serious modifications. For example, two of the three approaches selected in this paper (the monetary and social exclusion) were initially devised for developed countries (Laderchi et al, 2003).

1.1 The Monetary Approach

The monetary approach is the most commonly used. The reality of poverty is looked at from a monetary income (or consumption) perspective. Poverty is defined by a *shortfall in monetary income (or consumption) from some poverty line* where market prices are identified for the different components of income or consumption. Items that are not valued through the market (such as subsistence production and public goods) are imputed monetary values (Grosh and Glewwe, 2000). Welfare can then be measured as the total monetary income or consumption enjoyed, and poverty is defined as a shortfall below some minimum monetary income, which is termed the poverty line.

Consumption is often argued to approximate welfare more closely than income (Deaton 1997). The reasoning is that it comes close to a measure of long-term income, avoiding some of the short-term fluctuations in income and access to resources—of course under the assumption that individuals have access to credit and saving instruments.

1.2. The Capability Approach

According to Sen, who pioneered this approach, development should be seen as the expansion of human capabilities, not maximization of utility, or its proxy, money income (Sen 1985; Sen 1999). This capability approach (CA) focuses on indicators of the freedom to live in valued life as opposed to measuring well-being in monetary income terms. Thus, poverty is defined as failure to achieve certain minimal or basic capabilities, where “basic capabilities” are “the ability to satisfy certain crucially important functions up to certain minimally adequate levels”. (Sen 1993, p41).

The capability approach is rooted in a critique of the ethical foundation of utilitarianism. Assessing well-being and identifying policy objectives, according to this approach, is based on the rejection of utilitarianism as the measure of welfare and of utility maximization as a behavioral assumption. In the CA approach, well-being is seen as the freedom of individuals to live lives that are valued (termed the capability of the individual), i.e. the realization of human potential. When it comes to poverty, the focus is on “the failure of some basic capability to function” (Sen 1995, p.15) where basic capabilities are “intended to separate out the ability to satisfy certain elementary and crucially important functionings” (Sen 1992, p.45).

This emphasis on the “outcomes” characterizing the quality of life of individuals implies a shift away from monetary indicators (which at best can represent indirect measures of those outcomes) and a focus on non-monetary indicators for evaluating well-being or deprivation. Monetary resources are considered only as a means to enhancing well-being, rather than the actual outcome of interest. Monetary resources may not be a reliable indicator of capability outcomes because of differences individuals face in transforming those resources into valuable achievements (functionings), differences which depend on different individual characteristics (for example differences between individuals in terms of metabolic rates; differences between able bodied and handicapped individuals) or differences in the contexts individuals live in (e.g. differences between living in areas where basic public services are provided and areas where those services are absent).

1.3. Social Exclusion

The concept of social exclusion (SE) was developed in industrialized countries to describe the processes of marginalization and deprivation which can arise even within rich countries with comprehensive welfare provisions. It was a reminder of the multiple faces of deprivation in an affluent society. The concept of SE has been gradually extended to developing countries through the activities of various UN agencies (especially the International Labor Institute), and the Social Summit (Clert 1999).

The EU defines SE as a: “*process through which individuals or groups are wholly or partially excluded from full participation in the society in which they live*” (European Foundation 1995). The precise characteristics of SE tend to be society-specific, since they identify exclusion from *normal* activities. The concept of SE thus necessarily involves a *relative* approach to the definition of poverty. In industrial countries the indicators adopted in empirical work normally include unemployment, access to housing, minimal income, citizenship, democratic rights, and social contacts.

The application of the concept of exclusion to developing countries raises difficult issues. Characteristics of SE are likely to be different from those in developed countries. Empirical work in developing countries has adopted a variety of approaches to the definition of SE – mostly it seems taking definitions which seem relevant to the reality being studied, but without providing much justification for their particular choice, and rarely making any explicit reference to what is actually *normal* in the society. For example:

- (i) A study in India, (Appasamy, Guhan et al. 1996) defines SE as exclusion from health services, education, housing, water supply, sanitation and social security. This broad definition picks up very large numbers of people as being socially excluded.
- (ii) In Venezuela, Cartaya, Magallanes et al. 1997 first define social and political rights and then interpret SE as not having these rights.
- (iii) A study of Tanzania identifies certain very poor urban occupations and the rural landless as excluded (Rodgers et al, 1995).
- (iv) An ILO study in Tunisia used the perceptions of various groups to define social exclusion – the different groups produced different characteristics: the authors concluded that integration required employment and a guaranteed source of income (Bedoui and Gouia 1995).
- (v) In Cameroon and Thailand, ethnic minorities have been defined as being excluded given the prevalent reconstruction of citizenship. In the case of Thailand other categories also included were poorly educated farmers, informal sector workers and the homeless (Rodgers et al, 1995).

2. ICTs and Poverty Reduction

In this paper there will a distinction between the two parts of the ICT-poverty reduction relationship as follows:

1. ICT consumption: the use of technology in applications like e-commerce and e-government.
2. ICT production: the creation of hardware, software and other components of the ICT infrastructure.
- 3.

It is worth to mention that in this paper, we consider that ICT production does not just mean helping large hardware and software firms in developing countries but it expands to a broader and much deeper context. It encompasses IT consultants, IT trainers, Web designers, Internet service providers, data services providers, etc.

In the following section, we will discuss the role of ICTs in reducing poverty in its diverse meanings. We will particularly focus on the three approaches to defining poverty mentioned above namely; monetary, capabilities and social exclusion.

2.1. ICTs and Poverty Reduction: Monetary Approach

Welfare is approximately measured by consumption. The dynamic of growth from a consumption perspective is illustrated on Figure 1 which will serve the purpose of identifying appropriate ICTs involvement in breaking the poverty trap down.

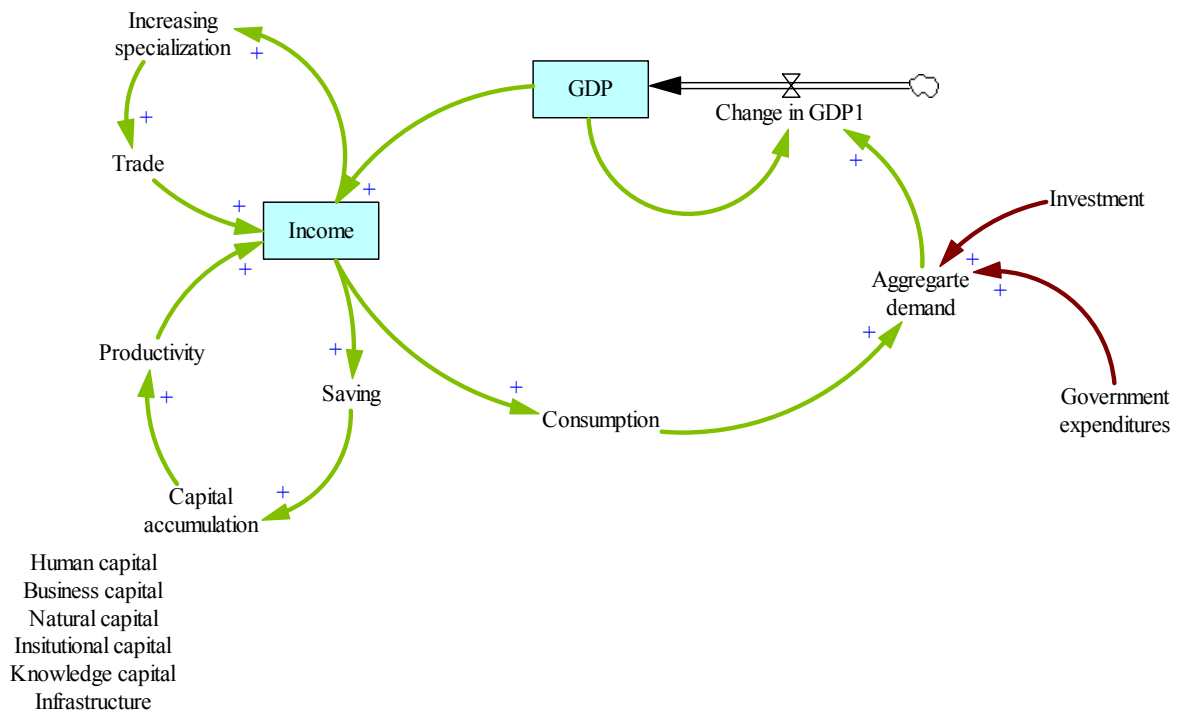


Figure 1: Growth Model

There are two ways to increase income for households. One is through saving which allows accumulation of capital thus, increases productivity. The second is through increased specialization which will lead to boosting trade. On the macro level, the increase in household income will lead to an increase in consumption which will lead to increasing the aggregate demand. In the poorest economies, poverty itself can become a trap. In poor economies, poverty is caused by lack of capital per person. For growth to function, capital—physical, human and natural—needs to be increased. Increasing capital requires more saving. The poorest of the poor need their entire income just to survive so there is no margin of income that can be invested for the future. This explains why the poorest of the poor become trapped with negative low or negative economic growth.

In practical terms, however, the relationship between growth and poverty reduction varies among countries. These variations reflect differences in income inequality. Therefore, for growth to benefit the poor and reduce poverty, growth should be pro-poor. There is, however, much debate around the definition of pro-poor growth, the relation between pro-poor growth, growth and inequity, and the links between the three and poverty reduction (Klasen 2001). The two approaches to define pro-poor growth are:

- Absolute pro-poor growth is measured by how fast on average the incomes of the poor are rising.
- Relative pro-poor growth is the case when incomes of poor people grow faster than those of the population as a whole.

The central question is in what context does investing in ICTs contribute to reducing poverty and achieving pro-poor growth. Evidence through practical experiences in the world indicate that investing in ICT consumption might contribute to increasing and deepening capital, in particular human and knowledge capital. On the other hand, it has been proven through countless experiences that there are factors that limit the ability to use ICTs effectively especially by the poorest of the poor and the marginalized groups. In the case of Internet, for example, such limiting factors in developing countries may include:

- Lack of local language and locally relevant content. Unless there is a concerted effort to overcome this constraint, Internet growth in many developing countries could be stuck in a low-use equilibrium (Kenny et al., 2001). The undersupply of pro-poor local content inhibits the virtuous circle, known as the network effect, whereby the growth of the on-line community makes the development of Internet content a more attractive commercial and social proposition, and increasing amounts of attractive content encourages the growth of the on-line community.
- People who do not understand the English language are also a marginalized section of society on the Internet. Such people include the majority populations of French-speaking Africa, the Middle East, Eastern Europe and Latin America. Even when users have basic English proficiency, they are discouraged from using web sites that are only in English.

Evidence has also shown that the gains from investing in ICTs production seem to be greater than consuming ICTs given that in our classification of ICTs production we assumed that IT consultants, IT trainers, Web designers, Internet service providers, data services providers, etc, are all accounted for in the production of ICTs. In practical terms, investing in ICTs proved to run from the top to the bottom of the economy. India's Tata Consultancy Services may be nudging the global Top 10 in software but it sits alongside tens of thousands of tiny backstreet database developers, PC assemblers and the like. This is likely to break the poverty cycle and increase the income of households which will lead to boosting consumption and aggregate demand and therefore, improves the GDP.

In sum, when addressing reducing the monetary poverty from an economic growth perspective, ICTs production seems to be a more effective measure in the battle against poverty than ICTs consumption. If the emphasis on economic growth as a way out of monetary poverty will persist, assisting medium and large scale ICT firms should be given equal weight to assisting small and micro scale firms which seem to have the least impact economically in terms of growth, incomes, efficiency and exports. Small scale firms will still be supported but the large ones are the better equipped to make sustainable use of ICT equipment and are the main engines of wealth creation and competitiveness. Special attention should be given to improving the quality of ICTs investment in terms of its impact on the poor.

For ICTs to contribute effectively to growth, ICT deployment should be accompanied by complementary investments such as organizational change. Special attention should be

given to getting the fundamentals right, so that markets and macroeconomic conditions are sound. The facilitation of diffusing the new ICT technologies should be a factor to consider when dealing with poor economies with particular emphasis on economically feasible solutions. Innovation plays a major role in boosting income generation. The below diagram shows how innovation contributes to increasing productivity and markets which will enhance investment and increase income.

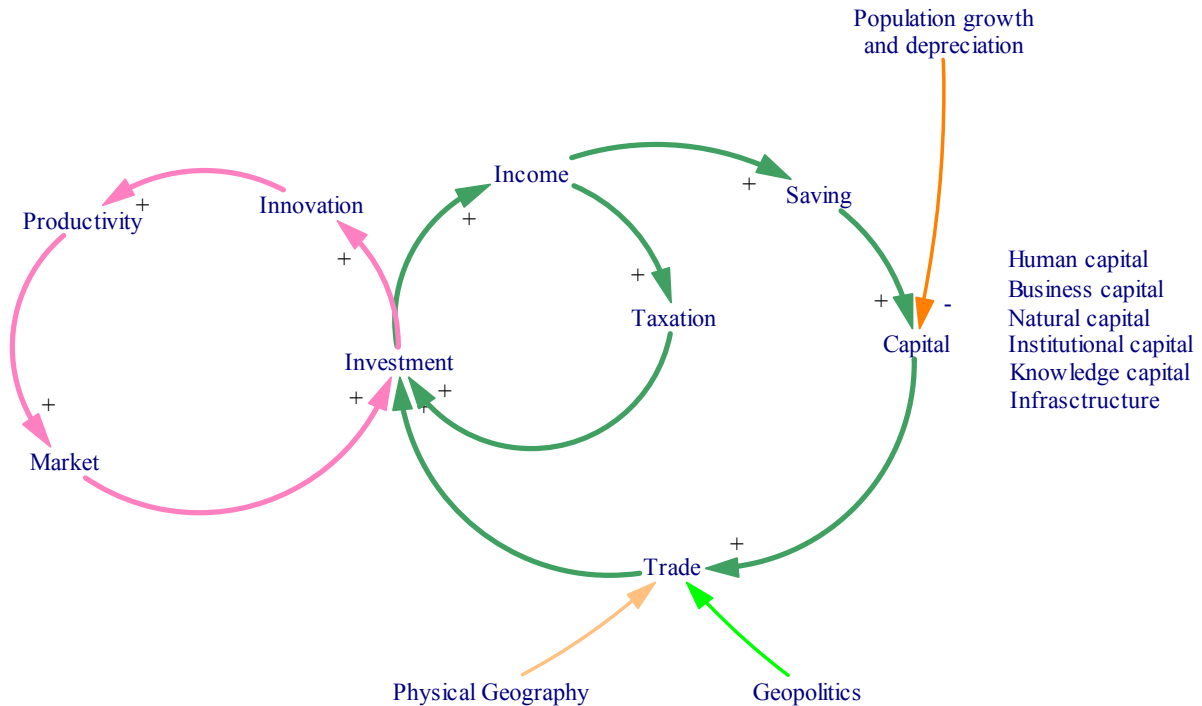


Figure 2: Innovation and growth

Last but not least, with the recognition that investment in infrastructure has significant impact on pro-poor growth, ICTs may be considered for their contribution as a sub-sector of infrastructure (for example, through telecommunications) (See, for example, IDCJ, 2004). However, in most national situations, the contribution of ICTs to pro-poor growth will be as an **enabler or tool** of other contributors to growth. It is a means to an end, rather than an end in itself.

3.2. ICTs and Poverty Reduction: Capability Approach

Translating the capability approach into an operational framework for poverty evaluation requires one to deal with a number of issues. Most fundamental is the definition of basic capabilities and of the levels of achievement which are to be considered as essential.

Operationalizing the theoretical framework of the capability approach to the evaluation of ICT role will be best put in the context of ICTs consumption as a facilitator to improved access to information and knowledge. The central question is whether and under which conditions the improved access to ICTs can enhance the individual and collective capabilities of the poor to better achieve the lifestyle they value.

ICTs under certain conditions can significantly enhance the human and social capabilities of the poor, thus empowering them at the individual and collective level. At the core of

this empowerment process stands the notion that ICTs can enhance peoples' control over their own lives. Similarly to literacy, newly acquired 'informational capabilities' can act as an agent for change for individuals and communities enhancing their abilities to engage with the formal institutions in the economic, political, social and cultural spheres of their life.

At the same time, case studies have demonstrated that due to the existing 'hype' around the potential benefits of ICTs, the high expectations of poor communities cannot be met. Experience shows that ICTs are only able to address certain aspects of development challenges facing poor people and that in fact they are not able to change the existing structural, social, political and economic inequality. For instance, while ICTs can act as an effective tool in improving the access of small-scale farmers to market price information, they are not able to address the underlying structural market inequalities between small-scale farmers and agro-businesses.

Furthermore, there is not a direct and causal relationship between ICT and poverty reduction. This relationship is much more complex and indirect in nature, whereby the issue of its impact on the livelihoods of the poor depends to a large extent on the dynamic and iterative process between people and technology within a specific local, cultural and socio-political context. Frequently, the most immediate and direct effect of ICT programs seems to be the psychological empowerment of poor people, whereby newly acquired ICT skills provide poor people with a sense of achievement and pride, thus strengthening their self-esteem.

A key recommendation is that the human development of people, rather than technology itself should be the center of the design and evaluation of ICT programs. As has been shown, the important advantage of using the 'capability approach' as the basis for the evaluation of ICT programs is its emphasis on the ability of ICTs to improve the daily livelihoods of poor communities, in contrast to more conventional approaches which overemphasize the significance of technology itself for social change. Furthermore, evaluations of the impact of ICT programs should focus on an analysis from the vantage point of the poor, rather than from the perspective of outside donors. The following are concrete recommendations on the manner in which ICTs programs should be designed in order to be most effective on facilitating the empowerment of marginalized groups:

- First, the potential benefits of ICTs are largest, when they are being fully integrated into other sectoral development programs (i.e. in education or health). It is, however, important that marginalized communities first identify and define their own needs and development priorities before, in a second step, a project can define whether and how ICTs can support the community's development goals.
- Second, ICT programs are most effective, when combining traditional media with new forms of ICTs. While the Internet is a powerful tool to connect networks and to exchange large amounts of information across long distance, community radios have a very broad reach and represent the most accessible and inclusive technology for the poor. Due to the oral tradition of indigenous communities this is of particular importance, considering that its use does not require literacy.
- Third, it is essential that ICT programs prior to initiating any project activities carry out a detailed assessment of existing information flows and information needs. The analysis should focus on how the new technologies can strengthen existing communication and information exchanges within and in between communities. The

assessment should furthermore identify key ‘information intermediaries’ in the community and analyze existing power relationships as they relate to the transfer of knowledge within the communities.

- Fourth, for the evaluation of the impact of ICTs on the livelihoods of poor communities it is crucial to analyze the process of how ICTs are being introduced. Outside agents or intermediaries may play a key role in supporting communities in appropriating the technologies to meet their own local and cultural needs. Within this process, it is key that community members gradually gain the skills to make meaningful use of ICTs as well as gradually take ownership of the management of the program. As the case studies have demonstrated, capacity-building activities and the provision of local content through intermediaries are two important factors, which influence, whether or not an ICT program will indeed strengthen the capabilities of the poor and thus contribute towards improving their livelihoods.
- Finally, the most important factors influencing, whether an ICT program has positive outcomes or not are social, political and cultural in nature, while the technical issues involved in the provision of ICTs frequently do not play a key role. ICTs can disrupt existing social structures and alter the power relationships within communities. Frequently ICT programs are not responding to a concrete need expressed within the communities, however are being designed through a top-down supply-driven approach. In order to avoid the potential social negative effects, it is crucial to base any ICT intervention on the existing social community structures. In other words, ICT programs should strengthen traditional information systems, build on existing indigenous knowledge and enhance existing information channels rather than undermine existing structures.

3.3. ICTs and Poverty Reduction: Social Exclusion

Social exclusion is a multifaceted concept, spanning social, economic and political dimensions. It is often associated with manifest pathologies of places and people such as unemployment, poor skills, low incomes, poor housing, high crime environments, poor health and family breakdown that together prevent people from participating fully in society (Social Exclusion Unit 2001). Social exclusion is often measured in terms of a basic standard of living as well as a right to participate in major social institutions such as employment, health care and education (Bhalla and Lapeyre 1997).

An investigation of possible associations between social and digital inclusion is imperative to a discussion of the implications of technologies in processes of lifestyle change for poor people. Social inclusion and digital inclusion are not synonymous terms (although in some ways they can be seen as being associated).

In this paper, the concept of social inclusion involves: inclusion into social support networks, social, economic, and institutional stability (through access to services); public participation in mainstreaming activities; and individual agency (having life-skills and motivation to be self-sufficient) (Ferlander and Timms, 1999). It is also considered that inclusion is composed of elements which are shaped and determined by multiple groups of people (Thomas and Wyatt, 2000).

In this paper, digital inclusion is seen as involving not just access to information and communication technologies (Thomas and Wyatt, 2000) but also ‘ICT capability’ where an individual requires the necessary skills to use the ICT, as well as the knowledge about when and how to use it, and the confidence to do so (Faulkner and Kleif, 2003a). It is clear that synonymy between the terms digital inclusion and social inclusion cannot be assumed. As has been shown, both concepts involve complex elements and meanings and can in fact be mutually exclusive for some individuals. For example, for a homeless individual who regularly accesses the internet and owns and uses a mobile phone, it can be said that he is digitally included but socially excluded (in terms of how the terms are understood in this context).

However, in examining any potential links between the use of information and communication technologies and social inclusion, mobile phones and the internet need to be considered separately since these technologies hold different meanings and are used in different ways and have a different bearing on people’s life. With respect to the internet, two factors may account for the fact that users may feel more ‘included’ when online: the anonymity of users in virtual domains, and the fact that users are not physically present, which allows individuals to withhold or manipulate any key features to their identity (Roberts and Parks, 2001).

Social interactions in cyberspace may widen or stabilize the social networks of individuals through the creation and maintenance of social contacts with others, such as via email or in chatrooms. This may have profound implications for the social support networks. For example, the significance of inclusion into peer networks (and habits) of local subculture was recognized by outreach workers, claiming that the key to helping clients is to quickly find accommodation for them before they become part of the subculture (“becoming really heavy into drug use” for example), through contacts made with other homeless individuals, leading things to “go downhill really fast”.

Not only can the internet provide links with other people, but also to the ‘information society’, which can be a significant resource of information for the poor. The usefulness of the internet stems from how it is used to provide the appropriate information. Thus, the resources and information that the internet provides may help to facilitate an individual in changing their situation, but by no means can its usefulness be taken to imply that this alone can change a person’s situation: *this motivation stems from the individual*.

Figure 3 is a simplified diagram that illustrates how information channels within a community can generate benefits which reinforce social capital. Also illustrated are possible model components which might limit the effectiveness of information channels. For example, low literacy with the community might be a factor that limits their ability to acquire, or use, information.

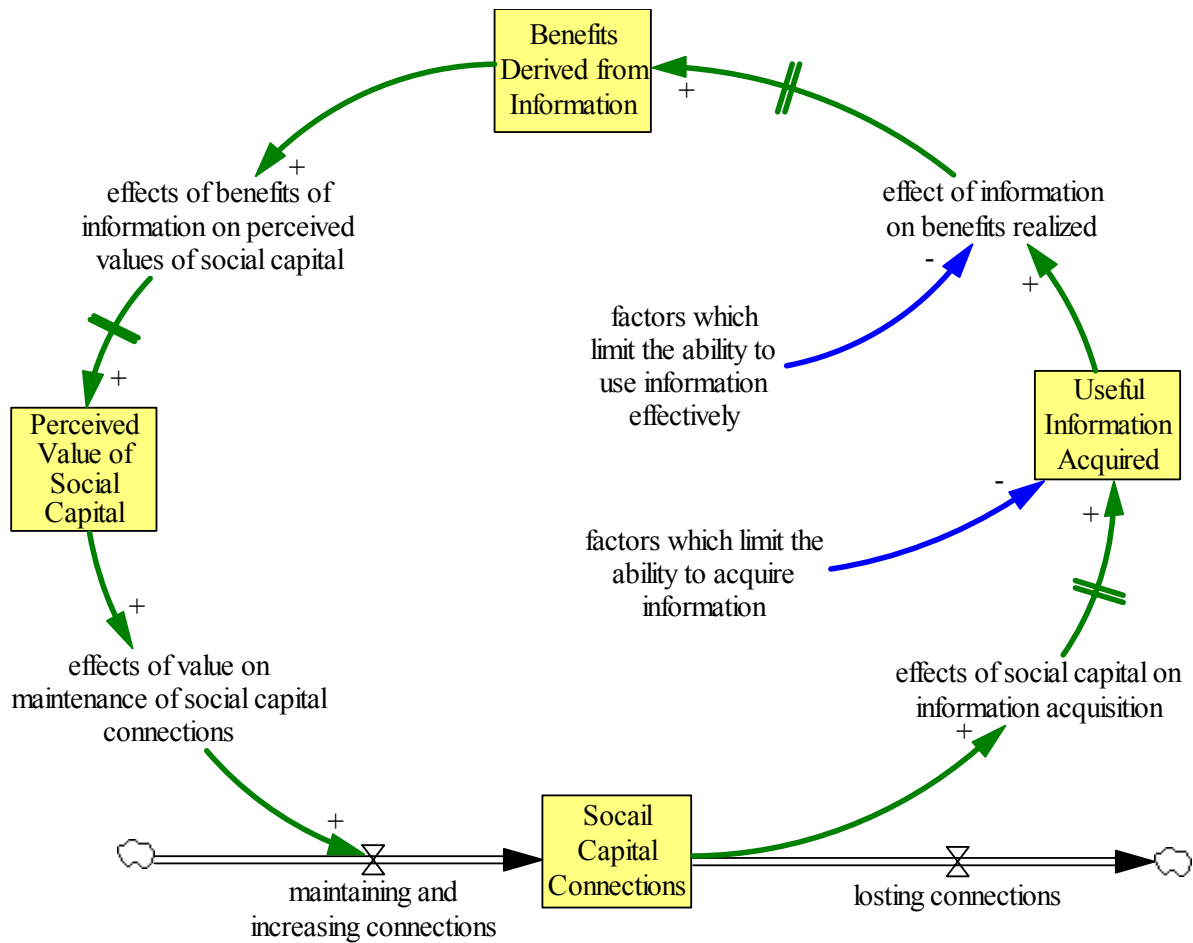


Figure 3: Benefits of Information Channels

3. Conclusions

Over 20,000 people die each day worldwide because of extreme poverty. This is a crisis that demands drastic measures that are innovative and sustainable. This will not occur without the realistic and holistic understanding of the phenomenon of poverty. The role of ICTs in reducing poverty as defined by the different approaches was analyzed. In particular, three understandings of poverty: the monetary approach, the capabilities approach and social exclusion were used to analyze ICTs role in combating poverty. The different approaches to defining poverty manifest the different interpretations of reality which is influenced by the varied perception on what constitutes a good society and good lives. The objective of exploring these differences and their implications was not assessing their merits but rather identifying how ICTs can contribute to poverty reduction holistically and realistically. System dynamic was used occasionally as a tool to communicate the structure that governs certain behaviors so that the role of ICTs is better defined and optimized. The analysis put together a detailed explanation on where ICTs can contribute and why they alone can not do the job of achieving widespread reduction in poverty.

As the accumulation of a wealth of practical experiences testifies, critical enabling conditions are required in order for the ICTs to achieve significant improvements in the livelihoods of the poor. In the absence of pro-poor policies for reform, reform of public services for e-governance, conducive telecommunications regulations and environment, decentralized decision-making, complementary infrastructure, education, advocacy, local entrepreneurship and participation and ownership by the poor, ICTs will only deliver sub-optimal returns. There is a need to continuously reflect on the multi-faceted and multi-dimensional nature of both poverty and the variety of conditions that enable ICTs to have their optimal impact on poverty reduction. It is essential that the technology-bound argument on poverty reduction is challenged as it is feared that this argument is breeding dangerous disillusion. And while it is fully acknowledged that utilizing ICTs in poverty reduction efforts is extremely important and necessary, it is always desirable to reflect on the notion that more is required than mere deployment of technology and that ICTs can not be regarded as a magic bullet.

From a monetary perspective, the role of ICTs to achieve poverty reduction and pro-poor growth was examined from two angles. From ICT consumption perspective, ICT might increase and deepen human and knowledge capital but there are factors that limit the ability of the poorest of the poor and the marginalized to use them. This said, investing in ICTs production is more appropriate in the battle to support the poor. All in all, however, the contribution of ICTs to pro-poor growth is about enabling the other contributors to growth. It is a means to an end not an end by itself.

Evaluating the role of ICT from the theoretical framework of the capability approach was examined from a consumption point of view. The consumption of ICTs plays a vital role in facilitating access to information and knowledge. However, ICTs can not change any existing structural, social and economic inequality. All in all, from the capability approach perspective, ICTs and poverty reduction are not linked directly. The impacts of ICTs on the livelihoods of the poor depend on the interaction between people and technology in certain local contexts.

When looked at from social inclusion angle, ICTs facilitate the digital inclusion which stretches beyond access to information and technologies to touch on ICTs capability that enables individuals to acquire the necessary skills to use ICTs efficiently. The link between digital and social inclusion is not direct and simple. Both concepts involve complex elements and meanings. Because mobile phones and internet hold different meanings and bearings in people's lives, both technologies were examined individually. These two particular technologies do help communities to feel more "included". The interactions in cyberspace may have profound implications for the social support networks.

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MDG2: Achieve universal education

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Your ability to read this book is a result of your having received the benefit of literacy through primary education. In developed nations primary education is a universal right, usually codified in national laws and often taken for granted. Unfortunately, and almost inconceivably to those of us who experience primary education as a certainty, one in five children from the world's poorest countries do not attend school.³⁷ The United Nations Millennium Development Goal (MDG) 2: 'Achieve universal education' was designed to address this education gap between the developed and developing countries. This chapter considers the specific targets of this MDG and why it is important, the challenges towards achievement of this MDG, including regional variability, and the relationship between this MDG and technology based education initiatives.

'Achieve universal education' is an extremely broad term that can be interpreted as having a wide remit. Perhaps surprisingly to those who experience government funded education to age 15 – 18 as a universal right in developed countries, MDG 2 'achieve universal education' is related only to the most basic level of primary education: five years of primary school. The specific target is to ensure that by 2015, "children everywhere, boys and girls alike, will be able to complete a full course of primary school."³⁸ The progress towards this target is measured through three indicators: 1) primary school enrolment; 2) 'survival' rates of those who enroll in year 1 reaching year 5; and, 3) youth literacy rates. These three indicators are meant to provide complementary data sets with enrolment providing a picture of how many children attend school, 'survival' rates signifying student retention once attendance begins and literacy rates signifying the quality of the education received. The United Nations identifies the 'survival' rates as particularly important because completing four years of primary education is seen as a threshold for literacy.³⁹ The United Nations has compiled statistics for these three indicators but cautions that the quality of the statistics is variable. Gathering of data is particularly difficult in the developing countries that also have the lowest primary school attendance.⁴⁰

At present seventy countries are at risk of not reaching MDG 2, which translates into approximately 115 million children world-wide not attending primary school. Retention rates are also of notable concern with nearly half of the children that begin primary school in the poorest developing countries dropping-out of school.⁴¹ There is significant variation amongst regions with positive progress made in Latin America and the Caribbean, Eastern Asia and Northern Africa where enrolment is above 90 percent of children and with retention rates of 85 – 97 percent to year 5 in these regions.⁴² The

³⁷ Data is from the United Nations, available: <http://www.un.org/cyberschoolbus/mdgs/goal2.asp> [March 18, 2006].

³⁸ United Nations Statistics Division (2005) 'Progress towards the Millennium Development Goals, 1990 – 2005', available: http://unstats.un.org/unsd/mi/goals_2005/goal_2.pdf [March 18, 2006].

³⁹ Ibid.

⁴⁰ Ibid.

⁴¹ Data is from the United Nations, available: <http://www.un.org/cyberschoolbus/mdgs/goal2.asp> [March 18, 2006].

⁴² United Nations Statistics Division (2005) 'Progress towards the Millennium Development Goals, 1990 – 2005', available: http://unstats.un.org/unsd/mi/goals_2005/goal_2.pdf [March 18, 2006].

regions with the greatest progress still to be made are Sub-Saharan Africa, Southern Asia, Western Asia and Oceania. The farthest behind is Sub-Saharan Africa whose enrolment in 2001-2002 was 62.2 percent, an increase from the 1990-1991 enrolment figure of 53.9 percent.⁴³ Within regions there is also variation of enrolment figures by countries. For example Niger has an enrolment of 34.2 percent⁴⁴ while Nigeria has an enrolment of 70.6 percent.⁴⁵

The total enrolment and ‘survival’ rates also obscure the very real gender dynamic of education. Of the 115 million children world-wide who do not attend primary school 3/5 of them are girls.⁴⁶ For example, in Nigeria the enrolment by gender is 8 girls for every 10 boys and ‘survival’ rates also vary by gender with 79 percent of boys completing year 5 in contrast with 66 percent of girls.⁴⁷ This translates into a gendered difference in adult literacy rates for those aged 15 – 24: 80.8 percent of men and 66.5 percent of women.⁴⁸ While some progress world-wide has occurred towards greater gender equality for primary education from 1990 - 2001, girls enrolment still lags behind. The largest gender gaps for primary education coincide with the areas with the lowest enrolments: Southern Asia (12 percent more boys enrolled); Western Asia (10 percent); Sub-Saharan Africa (7 percent); and, Oceania (6 percent).⁴⁹

There are multiple reasons for the lack of ‘universal primary education’ and the gender gap in enrolment by girls and boys. Lack of ‘universal primary education’ reflects the inadequacy of funding for education in some developing nations; some children are unable to attend because of the lack of a school accessible to their homes. The provision of universal primary education would cost approximately \$10 billion (US) per annum, a sum that equates to 50 percent of what people from the United States spend buying ice cream each year, which emphasizes the need for developed countries to provide increased funding for basic education initiatives in developing countries.⁵⁰ The funding that developing countries do have is also not distributed equitably internally. Despite the necessity of primary education to progress to higher levels of education, primary education receives less funding per student than secondary or higher education. The United Nations indicates that, “in most poor countries, the poorest 20% of the population receives less than 20% of the public spending on education while the richest get a higher share of government funds.”⁵¹

⁴³ Ibid.

⁴⁴ Ibid.

⁴⁵ Nigeria’s statistics for all MDG indicators are available:

http://unstats.un.org/unsd/mi/mi_results.asp?crID=566&fID=r15 [March 18, 2006].

⁴⁶ Data is from the United Nations, available: <http://www.un.org/cyberschoolbus/mdgs/goal2.asp> [March 18, 2006].

⁴⁷ Nigeria’s statistics for all MDG indicators are available:

http://unstats.un.org/unsd/mi/mi_results.asp?crID=566&fID=r15 [March 18, 2006].

⁴⁸ Ibid.

⁴⁹ United Nations Statistics Division (2005) ‘Progress towards the Millennium Development Goals, 1990 – 2005’, available: http://unstats.un.org/unsd/mi/goals_2005/goal_2.pdf [March 18, 2006].

⁵⁰ Statistic from Action Aid, available: http://www.actionaid.org.uk/index.asp?section_id=11 [March 18, 2006].

⁵¹ Data is from the United Nations, available: <http://www.un.org/cyberschoolbus/mdgs/goal2.asp> [March 18, 2006].

In areas where primary education entails attendance fees or related fees for items like books and uniforms, families with multiple children and limited financial resources often elect to send boys rather than girls as education is perceived to be of greater value to boys than girls. Elimination of fees can widen attendance by both boys and girls. For example, the elimination of fees in Kenya, Malawi and Uganda saw an increase in primary school enrolment.⁵² Non-attendance by girls in some locations is also linked to cultural reasons with some localities having a tradition of illiterate women being perceived as more suitable for marriage. Another reason for children not attending school and the gender gap is because children, particularly girls, are kept at home to help with family chores. The chores are often essential for the family's survival, such as gathering drinking water from a distant water source.

Lack of access to education, particularly as a gendered issue, hence also has causes directly linked to other Millennium Development Goals like providing access to clean water as a target of the MDG 7 'ensure environmental sustainability' and also addressing the fundamental issue of poverty (MDG 1: 'eradicate extreme poverty and hunger'). If a child is hungry or lacks clean water education unfortunately becomes a secondary concern to survival. Girls also encounter logistical difficulties with school attendance, such as the lack of adequate sanitation facilities (MDG 7 target). Poor areas may not have separate toilets for girls, or indeed any toilets at all. In some open landscapes the lack of a hidden location sanitary functions causes embarrassment and is another factor that discourages attendance by girls. This issue becomes particularly acute for older girls once they have begun their menstrual cycle with school drop-out rates for girls who remain enrolled beyond primary education increasing with the onset of puberty.⁵³ HIV/AIDS (MDG 6) has also been linked as a factor in the "education crisis"⁵⁴ in Sub-Saharan Africa both as a killer of teachers, which closes classrooms, and in preventing children from attending school. Children with one or both parents who are either sick with HIV/AIDS or who have died are left responsible for their own survival and often the survival of younger siblings. Older children are unable to continue schooling and often are without the resources to send younger children for primary education.

The United Nations emphasizes the importance of education for achieving a better path for development:

Providing children a basic education is the best investment the world can make in its future. Education reduces poverty by providing everyone with choices and opportunities to create a better life for themselves. Without universal primary education, no real progress can be made on the other Goals. Educated women have fewer children, get medical help sooner and provide better care and nutrition for their children. This reduces hunger, infant and maternal mortality, the spread of HIV/AIDS, and environmental damage.

⁵² Ibid.

⁵³ Lafraniere, S (2005) 'Another school barrier for African girls: no toilet'. *New York Times* December 23, Section A, page 1.

⁵⁴ United Nations Statistics Division (2005) 'Progress towards the Millennium Development Goals, 1990 – 2005', available: http://unstats.un.org/unsd/mi/goals_2005/goal_2.pdf [March 18, 2006].

Educating girls increases options future options for women, making societies in developing nations stronger. At present 25 percent of adults in the developing world are illiterate (872 million people) and 2/3 of those illiterate adults are women.⁵⁵ Primary education is the most fundamental basis by which today's girls can become tomorrow's literate women and it is estimated to cost approximately \$100 (US) to educate one girl.⁵⁶

Other chapters in this book discuss the benefits of ICT for development. While ICT and initiatives like the \$100 (US) laptop are beneficial, it is vital that the world community first recognizes and addresses the importance of meeting the most basic education needs of primary education from year 1 – 5 for the very poorest. Otherwise such ICT focused initiatives will have the result of further widening the gap between the very poorest and the poor in developing countries. This chapter has also identified the very real concern about the gender gap in primary (and as a result secondary and higher) education in developing countries. Initiatives like the \$100 (US) laptop need to institute measures to ensure that an *equal* number of girls and boys (e.g. *absolute* numbers rather than based on existing enrolment percentages where boys exceed girls) have the opportunity for access to the laptop and training with technology. This may entail specific pro-active measures such as explicitly funding girls' school attendance from primary school level in order to achieve this gender equity. Equality of provision for girls as well as boys is essential towards building better futures for the people in developing countries, and in our interconnected globe, a better world for all.

Universal primary education to years 1 – 5 is a very important MDG, closely linked to issues addressed in other MDGs. The achievement of this goal opens the opportunity for continuing to improve access to education by broadening the target to enrolment through secondary education. Perhaps this chapter has stirred you towards taking action to become part of the solution. There are a number of actions that individuals can take towards helping meet this MDG. Firstly, write to your national government representative and ask them to support funding measures for education in developing countries. Politicians interpret concerns expressed in a single letter as signifying the concerns of multiple individuals from a constituency; by writing you can be a voice for positive change. Secondly, a number of charitable organizations, like Christian Aid, Oxfam, and UNICEF, to name just a few, support education initiatives in developing countries. Some of these organizations also allow you to buy 'gifts' related to education, such as training a teacher or buying school supplies, where monies go to support their work in developing countries and a gift card that explains the charitable gift is sent to the recipient. Other smaller organizations have their entire focus on providing education and if you wish to make the difference on a personal level to an individual there are a number of charities that also offer the possibility for sponsoring a specific child. One example is

⁵⁵ Oxfam Education Report (2001), available: http://www.oxfam.org.uk/what_you_can_do/campaign/mdg/downloads/edreport/edreport.htm [March 18, 2006].

⁵⁶ United Nations statistics, available: <http://www.millenniumcampaign.org/site/pp.asp?c=grKVL2NLE&b=185519> [March 18, 2006].

Child Africa,⁵⁷ which focuses specifically on quality education and care for children in East Africa, including residence at schools for AIDS orphans. There are many different charities so through some investigation on the Internet you would be able to find one that focused on a location and with a specific mission that appealed to you.

⁵⁷ For more details see: <http://www.childafrika.org/project.asp> [March 18, 2006].

MDG3: Gender Equality and Women Empowerment

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Ndidi is the Founder and Executive Director of Growing Businesses Foundation (GBF) – an organization promoting improved living conditions and offer hope for a better future for thousands of people across Nigeria. The GBF mission is to “enhance collaboration amongst businesses, non-profit organizations and government, to promote the healthy economic development of communities and channel resources towards projects with sustainable wealth-generating potential.” She previously acted as the Head and Founder of the SecTrust Asset Management Division, with assets in excess of \$13 million. She has also worked with First Securities Discount House in credit, marketing and business development, with responsibility for the accounts of blue chip, non-bank issuers and investors. She holds a part-time position as Senior Lecturer in Business Ethics at the Lagos Business School, Pan-African University. She has published several books and articles in English and German.

Ndidi presently occupies board positions in a few development organizations in Nigeria, including Center for the Right to Health, Commonwealth Education Fund, Umuchinemere Community Bank, United World College National Committee as well as the Catholic Justice Development and Peace Commission. Internationally, she is a DAAD scholar, Reinhard Mohn Fellow of the Bertelsmann AG and co-ordinating team member of the tt30 Club of Rome.

1. The Global Context:

The Millennium Development Goals (MDGs) refer to agenda agreed upon and signed by majority member nations of the United Nations in year 2000, which identified eight minimum requirements linked to overall human development that member nations must strive to achieve by year 2015. These eight targets include the eradication of extreme poverty; achieving universal primary education; promoting gender equality and the empowerment of women; reducing child mortality; improving maternal health; combating HIV/AIDS, malaria and other health related diseases; ensuring environmental sustainability; and developing a global partnership for development. Worldwide, there is noticeable effort by various governments, research institutions, businesses, religious organisations, communities, non-governmental organisations, groups and individuals to measure their progress and activities along the lines of these targets. In some cases, there has been tremendous success, whilst in others, a woeful failure and overall inactivity in carrying out the requirements of this particular target of gender equity especially of women empowerment has been noted.

This contribution is a modest reflection on one of the eight Millennium Development Goals, namely the UN target of MDG3 in promoting gender equity and empowerment of women. As is clearly the case in most countries of the world, gender equity is one which is glaringly neglected, flagrantly abused and is far from being practiced or achieved. This is the case in many countries, communities, religions and cultures, both in the northern and in the southern hemispheres of our one world. This is also the reason why working hard and fighting to establish its achievement is a global and universal appeal. It is even necessary at this time and appears urgent because achieving the goals of gender equity (which does not in any way negate the distinctions and gifts of men and women played interdependently by virtue of their specific gender), promotes culturally rooted development, advances the integrity and beauty of creation, articulates the ambitions of the efforts of all stakeholders in building a world founded on equity and peace, and advances worldwide solidarity where each person has a chance to contribute his or her talents towards building up a sustainable environment for the common good. It is noteworthy that several efforts are indeed being made by governments and other stakeholders over the last years to seek for avenues that would redress the glaring imbalance based on gender inequality through promoting gender equity and women empowerment. There are noticeable successes in some countries and large gaps in others. However, there are enormous challenges everywhere to remove the stumbling blocks that prevent the achievement of an all inclusive society where human beings are respected and have equal rights, devoid of discrimination based on gender, colour, ethnic origin, class or religion.

From our knowledge of history and cultural anthropology, women have been discriminated against in every culture of the world both in antiquity and in the present times. The reasons for such discrimination are founded on ignorance, often due to problems associated in some cases with cultural and religious bias towards this sex because of their gender; the lack of equal access to education and skills which open doors to all on a level playing ground; the lack of access to means of achieving power, including money and social positions; and the inherent problems propelled by a new

global economy and philosophy where biological and natural gifts bequeathed to women are often used against them. Masculinity is thus posed against femininity, power against powerlessness, male against female, to mention but a few vital problems which seem to hinder gender equality and women empowerment worldwide.

The first postulation of this contribution is therefore to link gender issues with the justice question. Discrimination against women because of their gender is both an injustice and an aberration because it uses the background of sex to exclude women from rights, duties and privileges due to them while granting these to other persons just because they are male. Gender inequality is injustice, because it is a deprivation to persons of their rights and what is due to them by virtue of their ontology of being human. It is the role of justice, understood as “*suum cuique*”, to guarantee equity, establish fairness, and grant justice to all which in essence, is an extension of equality of access and means to all. Justice implies giving to each person, his or her rights, duties and dues. Injustice is its denial. Gender inequality and women disempowerment is an injustice in the current times because it negates the universal declaration of human rights proclaimed by the United Nations in 1948. It contradicts the constitutions and laws of several nations, and in fact, is against the belief systems of the great religions of the world that preach the equality of all created human beings before God and before the law for “all men and women are equal”.

2. The National Context:

Nigeria with an estimated population of about 150 million people, many languages and ethnic groups with a variety of religious persuasions, both Christian and Islam has a rich culture that goes into traditions that are ancient and noble. In the context of the colonial, post-colonial and the globalisation of the present times, Nigeria has to keep up to date with worldwide developments, not neglecting its own peculiar values and innovative development potentials. Women make up a large percentage of the Nigerian people, over 50% as documented in the 1991 census. Women rights and education has not always received adequate attention within the Nigerian cultural and geo-political scene. Since 1999, Nigeria has now emerged with a fledgling democracy after many years of military dictatorship. The result of prolonged military rules has been a steady decline in investment for social services including education which is key to any empowerment of people, especially women and children. Indicators of decline in the education sector included inadequate infrastructure, low enrolment and retention especially of girls; inadequately trained and poorly motivated teachers; low achievement in basic skills especially literacy and numeracy. The current democratic government, on assuming office in 1999, responded to the crisis to the education sector by launching the Universal Basic Education (UBE) programme, which was passed into Law by the national Assembly in year 2004 and thus signed into Law. Current statistics show evidence of increase of enrolment of children, especially women to schools, but there are still many concerns:

According to a research by the Action Aid International carried out in Nigeria in year 2005 and titled: “Education for Change”, the country stands at the risk of not achieving gender parity in participation in primary and secondary education. Many girls, especially in the northern states of the Federation still lack access to primary and secondary education;

many children, especially girls and children in difficult circumstances, still lack access to primary education (about seven million children are generally not enrolled); The public school system is marked by repetition, withdrawal and wastage rates; Infrastructure is till grossly inadequate with classes holding under tree shades in some remote rural areas and children sitting on the bare floor during lessons; There is still shortage of teachers in many states leading to very high teacher- pupil ratios especially in rural areas; there are many unqualified and under-qualified teachers with little or no motivation; lack of relevant instructional materials with grave implications for quality basic education. These and many other factors were identified and need to be addressed. In as much as they touch the issues of education, they concern essentially the basis and foundations for empowerment of women as key actors in the developmental agenda looking into the future.

3. Application and Response:

In Nigeria, women have always played a critical role in national economic growth and development. The contributions of women to the Nigerian economy, though not always obvious to the foreign eye or mind, have had a lasting impact on households, communities, and indeed the entire nation. In fact, most African family men will admit that it is women who most directly influence family welfare (economic, social, nutritional, etc) as well as the health and education of their children. Many (men and women alike) in Nigeria will cite their mothers as responsible for their own progress and promotion in economic, social and personal matters. Today, in a rapidly changing society and global environment where issues of literacy, political participation and formal work play a much greater role, the role and contribution of womenfolk is being called into question. The reality we must urgently confront is that in the modern world of economy, particularly in the context of an increasingly digital, capital-oriented and globalized world, if women lack the necessary education, influence and resources to care for their families and to fully participate in the development process, it seems unlikely that any of the MDG targets can be met.

As we consider the 3rd Millennium development Goal (MDG 3) - Promote Gender Equality and the Empowerment of Women – there are two shortcomings we should take note of:

- **The Danger of ignoring Context:** Firstly, the indicators used to measure progress with regard to MDG 3 consider only certain aspects of reality, namely gender equality in the spheres of education, work and political participation. However, true ‘equality’ and ‘empowerment’ for women involves much more, such as the values and emotions of women, their integrity, the linkage of women to the family and therefore the society at large, issues which needs to be addressed in order to retain content for sustainability, considered in the context of past, present and future.
- **The Dangers of a Non-Holistic Approach:** Secondly, gender is a specific focus in three of the Millennium Development Goals, namely those concerning gender equality, maternal mortality and HIV/AIDS. However, gender issues affect all the

other eight goals. In fact, without the women, none of the other goals would be said to be radically met or even sustained. It is thus the task of governments and their partners to integrate more seriously and holistically, the gender aspects of all the goals, or risk falling short of the mark set for MDGs in general. This point is particularly relevant in the economic dimension⁵⁸ which will be considered here.

From the above, the goal of Gender Equality and Empowerment of Women in Nigeria must include a specific focus on the aspects of economic empowerment. These are such that encourage self-help initiatives; access to capital for economic enterprise and microfinance which address the reality that over 65% of Nigerians operate in the informal sector, are poor, illiterate, and without access to many basic facilities including regular electricity, pipe-borne water, transport services, educational facilities or basic financial services from banks.

At this level, the criteria of education, work and political participation, seem shallow at best in terms of meeting the needs of the women to survive, even before they think of equality and empowerment. For many women, microfinance has served as a lever and empowerment tool to help themselves out of poverty through access to capital without, at best condescendingly, hope to ‘empower’ her to participate politically, or promote her equality.

4. Conclusion:

From all that has been said, it is now clear that it is not enough to enunciate policies and principles at high levels if they cannot be put into practice. Great ideas become great because they are practicable. This is the input made by the Growing Businesses Foundation towards encouraging and realising the agenda of the MDG goals on women equity and empowerment. The Growing Businesses Foundation was set up in 1999 in Nigeria by a consortium of large-scale private sector partners to ensure “sustainable economic development and social responsibility”. Realizing the increasing linkage of sustained profitability, ethical business conduct and social responsibility, GBF took stock of the increasing socio-economic imbalance in Nigeria, where issues of national concern include mass poverty, corruption, unemployment, rising crimes, rural – urban migration, dilapidated infrastructure, poor public amenities, entrepreneurs lack of access to credit, environmental degradation and declining educational standards. These issues underpin the urgent need to develop socially responsible business programs for women, many of whom live in rural and other small – scale environments, by building up a portfolio of products and services, and strengthening a network of relationships. In many of these initiatives, women are key. The vision of the GBF which is “sustainable economic development led by socially responsible businesses and individuals” became imperative as a means to make sure that people at all levels gave back to society what they received

⁵⁸ Using \$1 a day or less as a measure of poverty is based on income or consumption data for an entire household. A full understanding of the gender dimension of poverty is not yet possible using this type of data. However, when an analysis of resource allocation within a household was attempted, results showed differences in access to resources and in consumption by sex and age. Households headed by women face many obstacles to equal income and employment opportunities. Women also generally earn less than men, perform more unpaid work and have lower access to and control of resources.

from it. Through private-public partnerships, GBF believes that the Millennium Development Goals can make a positive difference in the lives of ordinary men and women through finance, technical assistance and training/ local capacity development. The potential of microfinance to facilitate the development of Micro, Small and Medium Scale Entrepreneurs (MSMEs) sector in Nigeria is pivotal to the overall economic development of the country. Microfinance is the key to women's empowerment. Women are the most effective agents in carrying out the interests of development at the grassroots, through education of their children, support for their families, initiation of market linkages, self reliance projects and economic empowerment.

Economic, political, social justice issues arise in the modern context of Nigeria which are hard-solved and which in order to address we must refer back to the strength and legacy of our traditional past in order to act in the present and sustain into the future. A good example of this is found in the fact that, in traditional society where people are subsistence farmers, the soil (earth) is -till today- central to the existence of the people. In Igbo culture for example, the earth is originally regarded as a goddess 'Ala' or 'Ani'. The concept of 'Ala' – the earth goddess – did not just refer to land as a factor of production, but was also believed to be the source and judge of human morality⁵⁹. Incidentally this also hints at the subtle but definite intertwining of the spiritual and the secular, as well economics with ethics, in traditional Igbo thought. Both these factors have unfortunately become distorted in modern life, and we would do well to go back to our roots to retrieve their inherent wisdom for application today.

Women's employment in the informal sector as a percentage of women's total non-agricultural employment is generally higher than for men. The difference is particularly evident in sub-Saharan Africa, where 84 per cent of women's non-agricultural employment is informal, compared to 63 per cent of men's. In Latin America, the percentages are 58 and 48 for women and men, respectively. The fact that in Northern Africa and Middle Eastern countries, the pattern is reversed, with employment in the informal sector being more important for men than for women,⁶⁰ hints at the fact that 'global' solutions are often, at best, insufficient.

Women represent the majority of the working poor. In most societies, women are primarily responsible for the care of family members. They therefore face greater constraints than men in the amount of time and effort they can put into paid employment. In developing countries, there is still considerable reliance on the extended family to care for younger children, the sick and the elderly. However as these social structures break down due to urbanization trends and modernization, there are few public or private services to respond to the needs of parents working outside the home and limited public action or legislation that seeks to harmonize work and family duties, even in areas where the impact of HIV/AIDS has dramatically increased the burden of care on poor working

⁵⁹ Meek, C. K. *Law and Authority in a Nigerian Tribe*, Oxford University Press, London, 1937, p 25 cited in Ike/Edozien p 49

⁶⁰ International Labour Organization, *Global employment trends*, p.19 (Geneva, 2003).

women. Very importantly, there is still little or no recognition of the contribution of household work to national economies and therefore little change in economic and social policies regarding caregivers.

Partly as a result of these factors, women represent the majority of the poor in both developed and developing countries. Out of the 550 million working poor in the world, an estimated 330 million are women, or 60 per cent.⁶¹ Several factors contribute to this situation, including the undervaluation of women's work and women's intermittent career paths, due mainly to their role as caregivers in the family and their greater need to balance work and family life. In the formal world of work, globally seen, despite some progress in women's wages in the 1990s, women still earn less than men, even for similar kinds of work.⁶²

The African woman never strived to be equal with a human being equal in dignity even if different in role and gender. Rather, she has strived always to be true to herself and to her God, as well as to support her home particularly her children. The African woman represents the strongest, most beautiful, most powerful personality – yes even the woman who carries the market goods on her head, a child on the back and at the same time children in either hand who she will drop at school on her way to the market. Our men know the strength of women. Ask them in a personal, quiet, private situation and they will admit it. The modern requirements of literacy, jobs, salaries, political status, etc have raised issues of Justice however, and to view this solely from a gender perspective would be inadequate. The promotion of women equity and empowerment remains a task that the MDG,s pursue. It is a task for all.

⁶¹ ILO, Global Employment Trends for Women, March 2004, p. 2.

⁶² Key Indicators of Labour Market (KILM) 2001-2002 edition (ILO, Geneva, 2002)

MDG4: Child Mortality

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Preamble

It is an everyday experience among us that young children die before they grow into adulthood for reasons that we can prevent but fail to. Human life is sacred and ought to be preserved with dignity. Thus it must be our collective interest and effort to fight and not only for their own sake but for ourselves. To do not pay highest attention to our children means to sabotage our own welfare and future. Our decision to bring them into the world must be accompanied with matching obligation to see to their welfare. Thank God mankind is rising to this urgent responsibility.

The turn of the new millennium signalled a renewed commitment among the commonwealth of nations aimed at addressing major issues that adversely affect man and his holistic development. These aspirations, the fourth of which is to reduce child mortality by two-third, are what constitute the Eight Millennium Development Goals, ratified by 191 nations in September 2003 signalling the common agreement of countries and leaders of the world to work towards the emergence of a better world order come 2015. The millennium development goals are ends in themselves but are also means and road map to more widespread productive life, economic growth, peace, stability and a better world order. How far these targets have been met is everybody's concern and we can look at the situation of child mortality in the world today as a case in point.

1. Understanding Child Mortality

Child Mortality is defined as the death of a child before the age of five while the rate is the probability or frequency of this occurrence per one thousand live births (U5MR). Also related but of this but of somewhat a narrower meaning is Infant Mortality which refers to the death specifically of babies within their first one year of birth (IMR). (Child and Infant Mortality will be used sometimes in the larger as well as in the narrower sense). As tragic as it is, children every day are allowed to die everywhere in the world. We all have seen or heard children die, and though we may pretend to be able to bear such individual losses, we cannot be so undisturbed if we know that many more are dying daily in the neighbourhood, especially from causes such as hunger, starvation, wars and especially of easily preventable and curable diseases like malaria, diarrhea, pneumonia etc.

2. Global Picture of Child Mortality

Statistics show that every year about eleven million children die before their fifth birthday, which means that 30,000 children die everyday, bringing it to about 150 every hour! Though this represents a global picture the death are not uniformly distributed with more developed and richer nations recording near absence of child death while the toll is much higher in poorer and least developed nations. For instance, the Under Five Mortality Rate (U5MR) in Western and Central African Countries which are the poorest areas of the world are as high as 180 to 200 hundred deaths per every 1,000 live births. In

the Eastern and Southern African Countries, it is a little lower than the Sub Saharan African Countries, but still very high at 150 deaths per 1,000 live births. In South Asia, it is a little below 100 deaths and in Middle East and North Africa it still above 50 death. Eastern European Countries, East Asian and Latin American countries have maintained a relatively low rate of about 30 deaths per 1,000 live births. In contrast, industrialized nations have maintained as low as 4 deaths per 1,000 live births meaning that virtually all their new born babies are almost certain to survive.

Forty-five years ago, the situation was much worse as one in every five live births did not survive. Fifteen years ago, the rate has fallen so rapidly and surely world over that hope was enkindled on the possibility reducing child birth by two third by the year 2015 in keeping with the faith of the ongoing campaign; this in itself a prelude to a struggle to eliminate child mortality or reduce it to the barest minimum. But while progress is continuous and definite in North Africa, Latin America, South Asia it is not so obvious in Sub-Saharan Africa where there has been only 10% improvement since 1990 taken as the starting point for a concerted global effort to bring total child mortality to less than two-third within twenty-five years culminating in the year 2015. Therefore while there is progress in many parts of the world, African countries and Nigeria in particular seem left out in the race.

3. Nigerian and Africa Perspective

Sub-Saharan Africa and Southern Asia accounts for more than two third of all the world child deaths. In 1960 Nigeria child death rate was alarming and it was not so different in many other nations because medicine had made such progress to ensure the safety of children and especially their survival to adulthood. Though Nigeria maintained a steady decline in U5MR of 290 in 1960, 265 in 1970, 228 in 1980, 230 in 1990 207 in 2000 and 197 in 2004 the rate of its decline has been among the poorest the world over. Such countries like Bangladesh and Algeria which had an U5MR of 248 and 261 respectively in 1960 have effectively brought their child death rate to 77 and 40 respectively as at 2004 survey, and even now the figures are much lower and encouraging. Today Angola and Sierra Leone has the highest Infant Mortality Rate in Africa at 182 and 170 deaths per one thousand births, but Nigeria stands very close with 112 deaths per one thousand live births. Considering her resources and strategic importance in Africa Nigeria should be rated the worst in the pursuit of this goal of reducing all child death by two third in the next nine years come 2015. This is because now more than 10% of the total children born in Nigeria die before their first birthday, and still many more die before their fifth birthday. Considering that statistics are not very reliable in Nigeria as many children are born in farms by nomadic and itinerant farmers and rural dwellers without any knowledge of child registration or even of medically assisted parturition, the statistics would almost certainly be higher. By defining how poor the situation is in Nigeria now with regard to Child Mortality, we by the same yardstick determine how tall is the amount of work and challenge that awaits us towards the children of today and those yet unborn for a sustainable life in this world.

4. The Tragedy of the Nigerian Situation

To what shall we attribute the high level of child mortality in Nigeria? There are so many reasons but poverty is central to the issue. Despite enormous human and material resources, wide spread poverty among the people of Nigeria is the major cause of many social ills as well as child mortality. With a low income of less than one dollar in a day for so many of its teeming population, there is nothing many Nigerian parents can do to save their children from hunger, malnutrition and starvation. In sickness and under threat of death the situation is even worse since they lack money to give them correct medical attention. Illiteracy, poor education level and widespread ignorance of basic first aid treatments for sick children have continued to swell the number of children who die from preventable and curable diseases such as pneumonia, diarrhea, malaria and measles which with AIDS accounts for more than half of deaths for children below five years of age. Most of these deaths and diseases therefore can be prevented and death reduced in one or a combination of the following ways. These include exclusive breastfeeding of infants, antibiotics for acute respiratory infections, oral rehydration for diarrhea, immunization, and the use of insecticide-treated mosquito nets and appropriate drugs for malaria. Ensuring proper nutrition is part of prevention, because malnutrition increases the risk of dying from these diseases. Child labour and the precarious situation in the oil regions of the Niger Delta with a high toll on children all combine to worsen the situation of child mortality in Nigeria. Maternal mortality too is one of the leading causes of child death in Nigeria since quite a great number of mothers die while giving birth to their babies. The death of the mothers are caused by poor health-care facilities, ignorance on the part of the women themselves, poverty and generally unfavorable condition under which many of these women live and bear their children.

5. Rays of Hope: Commitment of the Church

Near absence or total collapse of existing health facilities are also a major cause of child mortality. This is at a time when advances in medicine and the aid of technology has reduced the dangers associated with child delivery and treatment. The consequence therefore is that the vast majority of the population is at the risk of losing their children due to inadequate medical attention. In Nigeria most of the government owned hospitals had atrophied due to poor attention and management, making them incapable of fulfilling the reason for which they were erected. Where hospitals existed there would be no medicines. This painful vacuum was filled by the NGOs and other private initiatives. It is gratifying that the Church supplied health facilities to the majority of Nigerians when the government was unconcerned about whatever happened to its people. A great number of hospitals in the rural as well as urban places belong to the church and whatever major breakthrough that has been recorded in the area of health is by the unrelenting efforts of the church and other players in the private sector. Massive health care reforms which will strengthen medical institutions in the country and ensure the availability not only of medical personnel but also medicines, hospitals and health posts at the reach of even the rural and nomadic people of Nigeria will change the scene for the better.

Poverty is an inability to satisfy basic needs for lack of money. No doubt many Nigerian children die because their parents are poor and therefore unable to provide the basic things needed to secure a healthy life. Poverty also makes it impossible for government as well as individuals to make the required human and infrastructural investment for the growth of the economy and the realization of the MDG goals. In this case one may know what to do but lacks the resources to do so. Many children die not for the unavailability of hospital facilities but instead of the lack of resources either of government or parents or both to afford it. To overcome this, many church institutions offer loans of very low interest without collateral as demanded by commercial banks. In this way, small but hardworking businessmen are assisted to grow which will translate into better conditions for his/her families and dependents. Government is coming out with fresh initiatives and economic reforms that will reduce poverty drastically. This is a step in the right direction and about the most effective means of reducing the child mortality rate in Nigeria.

Low level of education in Nigeria is a critical factor that undermines the realization of the MDGs within the time limit hoped. Many parents can neither read nor write and are often unable to utilize opportunities provided for the prevention of illnesses and death such as immunization and inoculations against some killer diseases. Even worse is the inability, due to ignorance, of many people to help in the prevention and control of such killer diseases as HIV/AIDS, diarrhea, meningitis, hepatitis all of which have been the major cause of the death of children in the country. Education of course has been the traditional role of the Church and on this commitment it has not relented. Throughout the country, church schools are the best in performance and management. No need to say, numerous people are receiving empowerment for better and improved livelihood. Government schools instead are in disarray and entirely unhelpful for the challenging task nation building. Free and compulsory education for citizens up to a certain level, coupled with persistent and wide spread campaign on health issues and major killer diseases is a sure route to the reduction of child mortality in Nigeria. This is a major challenge facing the government. Chinua Achebe has said that the problem with Nigeria is solely and squarely that of leadership and this is true even in the case of high mortality for children. Governments over the years have displayed a high sense of directionlessness. In spite of huge incomes from crude oil and other sources the country has stagnated. The leadership lacks what it takes to turn the fortunes of the country around and join the rest of the world in a conscientious pursuit of these targeted goals. Nigeria has been slave to corrupt leaders who lack what it takes to pursue long term development agenda including of course the provisions of the MDGs to which they are signatories. Unless visionary leaders emerge with sufficient political will to back a determined effort towards achieving the goal of child survival, the scene will still be bleak. After all the future of this country lies with the children of today and if their life is not secured, the whole future of Nigeria as a nation could as well be in jeopardy. The Church acted as the conscience of this nation and with the press has been the stoutest opposition in the darkest days of military tyranny. Till date it has not given up this commitment fighting for emergence of better leadership for Nigeria.

Superstition and some cultural practices too are factors whose negative effects cannot be neglected if the fight for reducing child mortality rate will be won. It is not unusual to

attribute the death of a child to reasons other than their causes. Cultural beliefs like ogbanje (reincarnation) does dispose some people to accept the death of a child owing to supernatural causes and therefore normal and probative. At a time HIV/AIDS as well as meningitis were generally explained to be caused by witchcraft and sorcery. Those infected, children and adults alike were simply left to die. The picture was bad, but the combined efforts of government machinery and NGOs confronted this problem and today the picture is changing fast for the better. Many people have come to understand better the natural causes of diseases and are committed now to their prevention and control which they see is possible and profitable.

6. Conclusions and Way Forward

The Millennium Development Goals are a precipitate of general concern of world leaders to make the world a better place for human habitation. But of course the desire alone is not sufficient; it must be matched with action. The Secretary-General of the United Nations, aware of the several shortcoming that is attending the realization of the MDGs and worried that the results world-wide especially in the poorest countries of the world are not corresponding to expectations commissioned in 2002 the UN Millennium Project, a body saddled with the responsibility to evaluate the progress of the campaign world-wide and give technical insight into the practical means of realizing the goals and ways of overcoming hindrances and obstacles. The conclusion of this Commission was that the resources, knowledge and tools needed to realize these goals within the allotted time-frame exist. The major problem therefore is that the known solutions are not being implemented at a scale to match the ambition of the goals. Many countries are reeling under acute underdevelopment and debt burden which makes the whole campaign unrealizable. For this reason, the meeting of the most industrialized and wealthy nations held in Gleneagles in July 2005 agreed to cancel the debt burden of poor nations and double aids by 2010. Again September 2005 World Summit saw majority of the world leaders endorsing the MDG and promising more definite commitment to its cause. Even internet and information technology facilities have been deployed to aid the speed and ease of this work. But all these are as far as theory goes. More needs to be done for the practical dimension which is where the real action lies.

It cannot be ignored the massive political manipulations, economic sabotage, intellectual drainage, immigration constraints, technological handicaps which the poor developing nations are suffering in the hands of the developed and rich nations for their own further enrichment. The crisis of the world and the on-going war against terrorism is fed by the extreme economic imbalance that exist not only between the West and the East but even more so the yawning gap between the South and the North which everyday exacerbate than diminish. The crafting of major world documents and its implementations is carefully tailored to reinforce than weaken these economic differences. Whatever be the case, here is an urgent call for Nigerian leaders and policy makers to rise to the challenge and utilize the global concern on poverty reduction and general improvement of human life to improve the condition of Nigerians who have been suffering untold hardship. 2015 is not very far, all hope is not lost.

MDG5: Maternal health

Garry Conille & Brian Lutz

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Before that Dr. Conille, worked with the Ethiopian Ministry of Health as Chief Technical Advisor for health. During his tenor with the Ministry he led the process of designing Ethiopia's reproductive health strategy. He was also involved in the development of the country's National Health Strategy and Development Programme (HSDP III), the preparation of the MDG-based needs assessment, and the review of the health financing framework. He worked closely with department heads on strategic issues such as the government's Health Extension Programme (HEP).

Currently, Dr. Conille is Seconded to the Millennium Project as Health Policy Advisor and is responsible for providing technical support to countries that are in the process of developing their Poverty Reduction Strategy Paper's and substantive input into long-term health policy related issues. He also assists in planning and implementing the health component of the Millennium Villages.

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In recent years, the world has seen a surge in new and innovative technologies that, if well harnessed and widely shared, have the power to transform the ways in which the challenges of poverty are addressed. Indeed, today's breakthroughs in Information and Communication Technology (ICT) create the potential for universal access to basic knowledge in agriculture, commerce, politics, health and more—knowledge that can help improve systems, empower individuals and communities, encourage participation, and inspire the initiative and innovations that have helped create the wealth and progress that so many countries enjoy today.

In the context of the Millennium Development Goals (MDGs), universal access to information sharing means bringing the benefits of ICT to the most remote and deprived villages of the developing world. These villages face a daunting suite of poverty-related challenges, one of the greatest being intractably high rates of maternal mortality. This chapter examines the potential contribution of ICT to improving maternal health (MDG 5). The chapter begins with a comprehensive description of the difficult circumstances under which women give birth in the developing world, then examines the underlying social and economic causes of maternal mortality, and finally proposes key strategic areas in which ICT can help make a significant and lasting improvement in millions of women's lives.

In the words of Mr. Koffi Annan, Secretary General of the United Nations, “The *ICT age has dawned, but not yet for all, let us show that we can unite the great promise of ICT with the needs of the poor.*”⁶³

I. Maternal mortality: the quiet killer

The World Health Organization defines maternal mortality as “death while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.”⁶⁴ Based on this definition, it is estimated that every minute of every day a woman dies from pregnancy- and birth-related causes. Ninety-nine percent of these deaths occur in developing countries, revealing a large disparity between developing and developed countries.⁶⁵ The lifetime risk of dying from pregnancy related causes—defined as the chance that a woman will die in pregnancy or childbirth at some point in her life—illustrates this disparity even further. Women in more developed countries have a 1 in 4,085 lifetime risk while in Africa, the risk is 300 times greater.⁶⁶ Over the next ten years, more than 2.5 million maternal deaths are expected in Africa alone—two orders of magnitude greater than the projected 25,000 maternal deaths in the developed world (UNFPA, UNICEF and WHO 2004).

⁶³ Launching ceremony of the information and Communication Technology (ICT) Task Force 21 November 2001; Press release SG/SM/8037 DEV/2354

⁶⁴ WHO – International Statistical Classification of Diseases and Related Health Problems. Tenth Revision, Geneva, 1992.

⁶⁵ Irvine Loudon, “The Transformation of Maternal Mortality,” *British Medical Journal* 305 (1992):1557-60

⁶⁶ World Health Organization (WHO), United Nations Children's Fund (UNICEF), and United Nations Population Fund (UNFPA), *Maternal Mortality in 1995: Estimates developed by WHO, UNICEF and UNFPA* (Geneva: WHO, 2001).

Maternal death, although tragic in its own right, is not the only concern. For every woman who dies, thirty more suffer some form of disability, including anemia, uterine prolapse, pelvic inflammatory disease, infertility and fistulae (UNICEF 2003). Fistulae are holes in the birth canal resulting from damage due to difficult delivery. These holes allow urine to continuously leak. Women and girls who develop fistulae become social outcasts, often rejected by their husbands and families. Approximately 2 million women are currently living with obstetric fistulae, and 50,000 to 100,000 new cases occur each year (UNFPA 2004). In 2001, the cumulative total of those affected by maternal mortality and morbidity was estimated at 300 million—more than a quarter of adult women in the developing world.⁶⁷

Finally, maternal mortality carries devastating social and economic consequences for affected families and communities. When a mother dies, children lose their primary caregiver, communities lose her paid and unpaid labor, and countries lose her contributions to economic and social development. Children who survive their mother's death are up to ten times more likely to die within the first two years of life than children with two living parents. Children without mothers are also less likely to receive health care and education.

II. The Global Response: Building commitment and solidarity

Since the 1948 Universal Declaration of Human Rights, countries around the world have endorsed more than 20 conventions, global meeting outcomes and declarations that recognize the devastating nature of maternal deaths and reaffirm the right of every woman to safe motherhood. In the past 15 years, maternal mortality and morbidity have been elevated to urgent public health priorities requiring sustained investments, especially for vulnerable and underserved populations, in universal access to a range of high quality, affordable reproductive health services and technologies, including safe motherhood and family planning. In 1994, at the International Conference on Population and Development (ICPD) in Cairo, and later at the Fourth World Conference on Women (FWCW) in Beijing, governments from developed and developing countries agreed to work toward establishing integrated safe motherhood programs within the context of primary health care. Governments aimed to reduce maternal mortality and morbidity to one-half of 1990 levels by the year 2000 and by a further one-half by 2015.

In 2001, 189 countries endorsed the eight Millennium Development Goals that emerged from the Millennium Declaration in September 2001 and from the subsequent UN Secretary General's report entitled "A Road Map Towards the Implementation of the UN Millennium Declaration" (GA Resolution A/56/326). A year later in Monterrey, Mexico, governments reiterated their commitment to the Millennium Development Goals (MDGs), which aim to reduce poverty worldwide. Recognizing the critical nexus between poverty and child and maternal health, two of these goals aim for "*a reduction in infant and child mortality rates by two-thirds by 2015 and a reduction of maternal mortality ratios by three-quarters by the year 2015.*"

⁶⁷ UNICEF, "Maternal Care: End Decade Database," www.childinfo/edd/mat_mort/index.htm.

More recently, the outcome document of the 2005 World Summit reaffirmed the importance of reproductive health, including maternal health, in achieving all of the MDGs. The document emphasizes as a key priority “achieving universal access to reproductive health by 2015, as set out at the International Conference on Population and Development, integrating this goal in strategies to attain the internationally agreed development goals, including those contained in the Millennium Declaration, aimed at reducing maternal mortality, improving maternal health, reducing child mortality, promoting gender equality, combating HIV/AIDS and eradicating poverty” (UN 2005, paragraph 57g)

Regional efforts in support of safe motherhood have also flourished. In Africa, for example, the African Regional Reproductive Health Task Force, held from 20-24 October 2003 in Dakar, called on all partners to develop and implement a Road Map for accelerated maternal and newborn mortality reduction. The Road Map provides a framework for building consensus around strategic interventions to address maternal mortality.

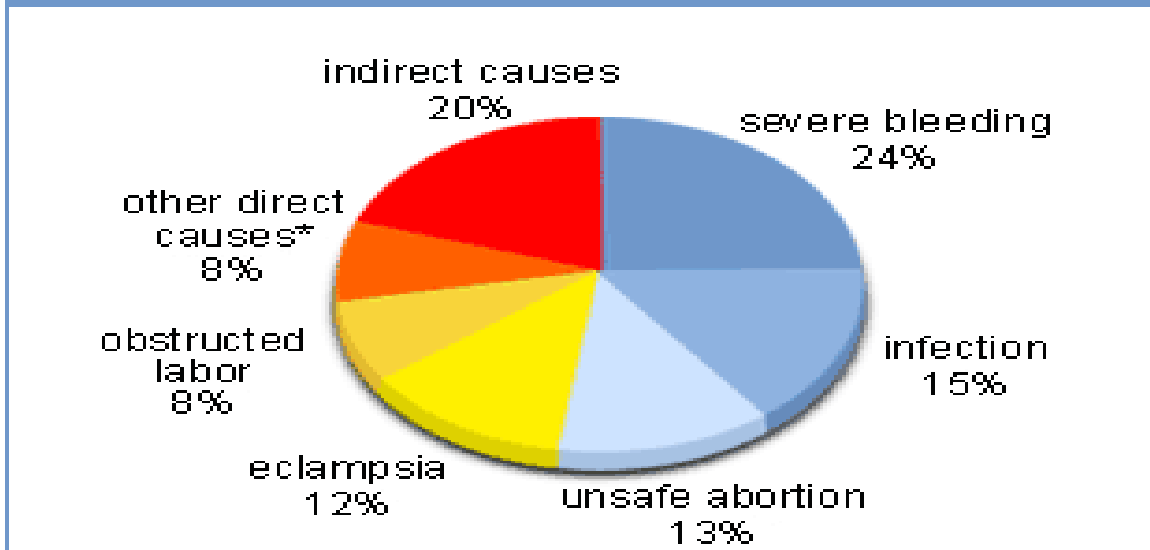
Still, despite growing interest and commitments from donors, governments and civil society, maternal mortality remains one of the goals toward which countries have made the least progress since the Millennium Declaration. Governments, in collaboration with development partners, will have to address important challenges to reduce maternal mortality and morbidity.

III. Determinants of maternal mortality: framing the issue and understanding the challenges.

Maternal deaths are mostly the result of direct and indirect pregnancy-related complications (Figure 1, next page). Nearly 80 percent of maternal deaths are caused by hemorrhage, sepsis, unsafe abortion, eclampsia and/or prolonged labor. The remaining 20 percent are caused by existing medical conditions, such as HIV/AIDS, chronic malnutrition and malaria aggravated by pregnancy.

Figure 1

Causes of Maternal Death



* Other direct causes include ectopic pregnancy, embolism, anesthesia-related

** indirect causes include: anemia, malaria, heart disease, HIV/AIDS.

Source: "Maternal Health Around the World" poster. World Health Organization and World Bank, 1997

Most of these conditions can be properly managed if every woman had access to skilled attendants at delivery and emergency obstetric care in case of complications. A variety of social, economic and cultural factors, however, prevent timely access to and utilization of these services, even when the services are supplied. Sreen Thaddeus and Deborah Maine summarize the main bottlenecks to safe delivery for women in developing countries in the now well-established paradigm of the "three delays." They include:

- 1st: delay in deciding to seek care because of lack of money, limited awareness, low status of women, etc;
- 2nd: delay in reaching treatment facilities due to distances, lack of transport etc;
- 3rd: delay in receiving adequate treatment at facilities because of poor quality, organization and management.

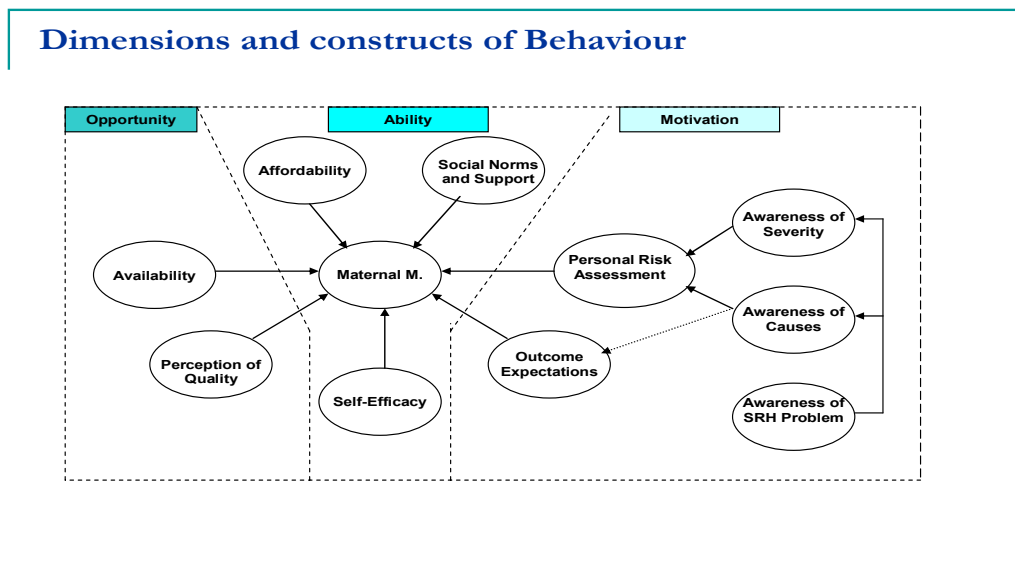
The three delays framework moves beyond simple service supply to issues of access, embracing the multiple dimensions of maternal mortality and underscoring barriers such as low levels of self efficacy, gender inequalities, direct and opportunity cost to service utilization. All of these factors have been shown to hinder appropriate and timely care. Furthermore, the "three delays" framework helps identify, analyze and address deeply rooted causes of pregnancy related deaths through integrated, sustainable and evidence-based strategies and technologies that include but are not limited to medical services.

Indeed, in the developing world, women are often unable to make choices about their health and lives because of low social and economic status. Nearly half of them live more

than five kilometers from the nearest health institution, which is often perceived as low quality. Because women have little or no control over household revenue, they cannot afford to use services even when services are free or low cost. All of these factors create an environment that discourages health seeking behaviors and hampers care even in circumstances where services are physically available.

The PSI Behavior change framework, proposed by Steven Chapman and colleagues for family planning, offers a more comprehensive, detailed model of health seeking behavior than presented by the three delays (Figure 2). The framework, which outlines the dimensions or constructs that experiments have suggested as necessary for health seeking behavior, is based on several theoretical models of behavior change, including the health belief model, the theories of reasoned action and planned behavior, and social cognitive theory. The principal strength of the model lies in combining dimensions or constructs across theories that may (or may not) be associated with behavior change.⁶⁸

Figure 2: PSI behavior change Framework



The dimensions or constructs of the framework are summarized into three different groupings:

- *Motivation.* Motivation encompasses awareness of a health problem, its causes and severity. This awareness then results in an assessment of personal risk. Separately, both awareness of the health problem and the expected benefits of using solutions to that health problem—solutions like skilled attendance at birth to prevent and manage complications—are believed to be directly related to a person’s propensity to use a health product or service. In general, motivation is considered to be an individual-level phenomenon.

⁶⁸ Steven Chapman: PSI Behavior change framework 2003

- *Ability*. Groups, families and others set social norms, provide support, and resources that assist or inhibit individuals to be able to act, given motivation. These dimensions are summarized as “ability.”
- *Opportunity*. Awareness of opportunities and other elements of the external environment and the health system or societal or structural level elements that are thought necessary to increase the likelihood that a person will be able to use a health product or service.

Today, evidence-based strategies and technologies, solidly grounded in country-level experiences, are available for dealing with each of these constraints (three delays, behavioral framework), and can be widely provided at low per capita costs. *Motivation* and *Ability* constraints, largely associated with *delay one* and parts of *delay 2*, can be improved through appropriate technologies and policies that promote and support mass and proximity behavioral change communication (BCC) efforts, greater community awareness and involvement as well as actions that empower women and involve men. *Opportunity* limitations, which are more closely associated with parts of *delay two* and *delay three*, can be tackled through performance-based management, more effective deployment and supervision of skilled services providers, strategic investments in basic health infrastructure, referral systems, equipment, supplies and logistical support.

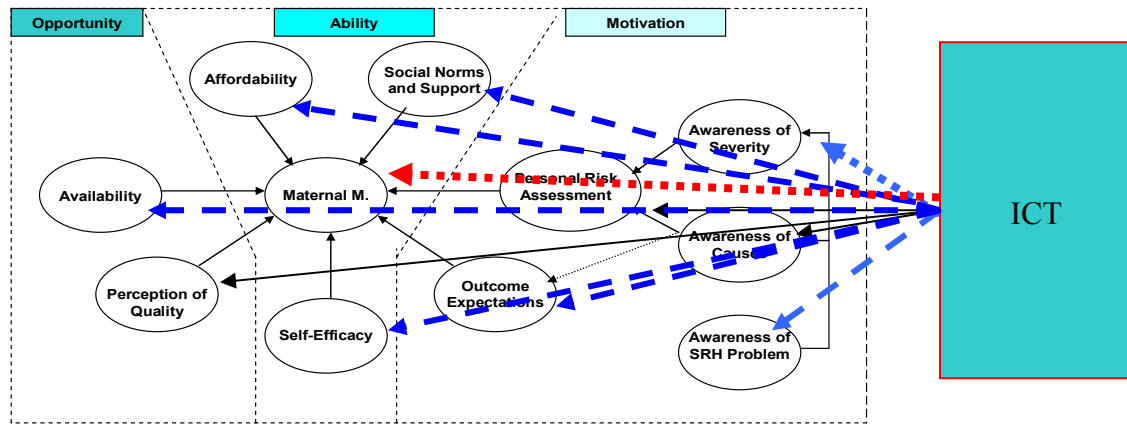
IV. The strategic value of information and communication technology (ICT) in achieving the maternal health MDGs: looking forward

ICT can help accelerate maternal mortality reduction in many ways: (1) by improving social and economical welfare; (2) by helping to empower institutions, communities and individuals; and (3) by influencing behaviors through enhanced access to information and knowledge that provide the basis for informed decision-making.

When ICT is aligned with the Behavior Change framework, the scope of ICTs impacts on determinants of health seeking behaviors, particularly in the context of maternal mortality and morbidity, becomes clearer.

Figure 3 ICT and the Behavior Change Framework

Dimensions and constructs of Behaviour



Opportunity:

Recent evidence has irrevocably demonstrated that access to basic and emergency obstetric care during labor is central to reducing the levels of maternal morbidity and mortality (Safe Motherhood Initiative, WHO 2004). Yet ensuring sustained availability of quality maternal services in resource-constrained settings is often compromised by several interrelated factors: (1) lack of national commitment and financial support; (2) poor coordination among partners; (3) poorly functioning health systems; (4) poor logistics for management of drugs, family planning commodities and equipment, (5) weak national human resource development and management; and unclear policies concerning practice regulation. Addressing these constraints at each point of the planning process and supply chain requires effective and efficient investments in managerial capacity, skilled human resources, infrastructure and institutions grounded in systematic, transparent and knowledge-based planning and guided by real time information sharing.

Needs assessment

The first step in securing a reliable supply of maternal health services and reproductive health commodities is to determine what services and supplies are needed at each level of the health system. These needs are based on coverage targets and on population-level demographic and epidemiological information: number of women of childbearing age, unmet contraceptive need, number and duration of pregnancies, current antenatal coverage, etc.

ICT can aid in the needs assessment process in several ways. First, ICT can increase the quantity and quality of population data and, through simple spreadsheets and databases,

expedite the organization and interpretation of the data. Second, ICT can easily monitor levels of resources, such as inventory and personnel, to anticipate resource gaps. For example, continuous, real-time monitoring of inventory through ICT can immediately alert managers when supplies fall below critical thresholds. These thresholds could be fixed or linked via information networks to other systems, such as malaria surveillance systems, to estimate needs—in this case, antimalarial drugs—for pregnant women under changing conditions. Third, ICT can link different providers together to increase coordination. In some areas, many different NGOs and government work alongside one another but find it difficult to track each other's activities, which could lead to duplicated efforts or supply shortages.

A needs assessment to reduce maternal mortality is not limited to only human resources and supplies, as timely access to these resources is critical to save women's lives. Access depends on the quality and relative location of infrastructure, such as basic and emergency obstetric care facilities and roads, as well as the supply of emergency transportation to link households with higher levels of the health system. Geographic Information Systems, a powerful ICT tool, helps planners visualize and integrate different layers of spatial data. Through GIS programs, maps can be created that integrate spatial data points (e.g., villages, roads, health facilities) with attributes about those points (e.g., population size of villages, ratios of skilled birth attendants to population, number of obstetricians at health facilities, etc.). By integrating this information, GIS allows planners to quickly identify obstacles to access and determine additional resource needs of different communities. This is the intention of IMMPACT, a research initiative at the University of Aberdeen, Scotland. IMMPACT uses GIS to initially map health facilities and villages in Burkina Faso and Ghana as a first step in improving maternal health (<http://www.abdn.ac.uk/immpact/index.php>).

Supply chain management

Once determined, supply needs are communicated to central procurers, who review and approve requests. To obtain commodities, procurers then select and pay a distributor(s). Foreign distributors process requests and ship commodities to countries, where the imports are reviewed according to government policies and eventually enter domestic distribution networks for delivery at appropriate health facilities. ICT can expedite each step of the supply chain by creating electronic links among local facilities, procurers, foreign and domestic distributors and import authorities. For example, procurers could use the internet to quickly compile a list of possible distributors, prices and expected delivery times. Orders can be placed through a variety of media, including internet, fax and phone. Electronic payments may also be allowed. ICT could also permit real-time tracking of the movement of supplies to improve monitoring, combat waste and abuse and reduce uncertainty in the delivery date.

Training of skilled birth attendants and other health workers

Once completed, a maternal health needs assessment indicates how many skilled birth attendants (SBAs) are required to achieve given coverage targets for delivery care.

Through ICT, this information can be integrated with information on current and expected levels of SBAs to estimate the resource gap. Training new SBAs and upgrading the skills of current SBAs can pose a logistical challenge, especially in rural areas at a great distance from established training facilities. Distance learning uses a variety of media—videoconference, lectures recorded on tape, internet—to help close this gap. The internet in particular offers health workers in remote locations access to the latest research and best practices, enabling continuous, self-directed improvement in skills.

Deployment of health workers

After pre- or in-service training, health workers are deployed to facilities and villages to provide health services. GIS can help planners ensure that health workers are deployed in sufficient numbers to the places that need them. Other data layers, such as those on cultural norms and practices, can be integrated into GIS to help planners determine optimal profiles and skill mixes for deployed health workers. For example, religious and cultural practices in certain parts of a country may only allow women to provide antenatal care and delivery assistance.

Links to the larger health system

Strong referral systems and efficient links to the larger health system are necessary to significantly reduce maternal mortality. ICT can enhance both of these. First, mobile communication networks can improve physical links by expediting the response of emergency transportation. Second, ICT can create virtual links—telemedicine—between birth attendants and more highly trained personnel at district and referral hospitals. Mobile phones, radio units and digital cameras can all serve to enhance the quality of first-line care and improve referral capacity. When women are moved to different levels of health system for care, communication networks and integrated, electronic patient data systems can also help secure continuity of care (see Box 1, next page).

Box 1**RESCUER Project: Using Communication Technology to Improve Virtual and Physical Links to the Ugandan Health System**

In March 1996, the Ugandan Ministry of Health launched the Rural Extended Services and Care for Ultimate Emergency Relief (RESCUER) project to improve maternal health. Begun initially as a pilot project in the Iganga District of eastern Uganda, RESCUER adopted a three-pronged approach: (1) improve communication between traditional birth attendants (TBAs) and the formal health system, (2) provide adequate transport between levels of the health system and (3) improve service quality by increasing staff levels at health units and by providing training to TBAs and other health workers.

To improve communication links, RESCUER utilized solar-powered VHF radio, with fixed base stations at all health units, mobile walkie-talkies with TBAs, and vehicle radios in the referral hospital ambulance and District Medical Officer's vehicle. The VHF radio system was selected for a variety of reasons: lack of electricity and wired telephones, need for 24-hour availability, sustainability, etc.

Within 3 years, RESCUER had already yielded impressive results. The walkie-talkies enabled TBAs to attend more births and improved the credibility of TBAs, which increased compliance with referral advice. The technology also provided a virtual link between the women and more highly trained health personnel, a link that allowed TBAs to better manage and refer cases. These factors increased the percentage of deliveries under trained personnel and contributed to a 50% reduction in the maternal mortality ratio from 500/100,000 in 1996 to 271/100,000 in 1999.

This case study demonstrates the significant impact that simple, cost-effective ICT can have on maternal health. The example also highlights the integrated nature of solutions to maternal mortality; only when linked to effective transportation services and trained health personnel are communications networks most effective (Musoke 2002).

Ability**Affordability**

Even with a steady, reliable supply of maternal health supplies and services, price can be a significant barrier to utilization. ICT can directly and indirectly reduce cost barriers. By streamlining the supply chain and creating opportunities for just-in-time delivery, ICT can help alleviate bottlenecks and reduce the time that inventory sits idle. These time and cost savings can translate into cheaper goods and services, thereby increasing health seeking behavior. Communication technologies can also increase community awareness of governmental regulations on prices to prevent exploitation of information asymmetries. ICT also has an indirect effect on affordability. By enhancing productivity in other sectors, communities may have more disposable income to allocate to health services.

Social Norms

Social norms and cultural practices can also create barriers to the utilization of available maternal health services. ICT, especially the internet, creates networks through which individuals can share values and experiences. This sharing might relax certain cultural norms that decrease health seeking behavior as well as strengthen cultural practices that encourage health seeking behavior.

Motivation

Women's awareness of maternal health complications—their causes and extent—as well as the efficacy of solutions is crucial in motivating women to seek delivery and obstetric care. Again, ICT plays an important role in informing women about the risks and benefits of available care. Awareness campaigns can be launched through mass media outlets, such as the radio, television and internet. The internet in particular can provide women access to the latest information and best practices on an ongoing basis.

Accountability

While not an explicit part of the behavior framework model, accountability plays a crucial role in the availability and affordability of health supplies and services to end users. In the absence of strong accountability systems, unscrupulous officials can siphon funds from health budgets. Drugs can disappear from clinics, resurfacing later in black markets at higher prices. Health providers may charge fees in excess of government caps or provide services for which they are neither trained nor certified, such as unsafe abortions, a leading cause of maternal mortality. These are some examples of corruption and abuse that affect health seeking behavior and, ultimately, health outcomes.

ICT can play a critical role in strengthening accountability systems. The performance of lower level health workers, such as birth attendants, can be tracked through ICT systems that regularly gather, organize and interpret data on maternal outcomes. After analysis, these data can indicate if health workers are appropriately distributed and which health workers may be in need of additional training. Furthermore, transparent budget processes, a key component of accountability, rely on efficient, timely communication networks. Through radio, television, internet and other media, these networks can inform communities of the levels of funding that are earmarked from the central to local governments for health services. These communication technologies help communities, especially those in remote areas, understand what services and supplies should be provided by the health system. When individuals are aware of what services and supplies they should receive, they can demand these services from providers and report via ICT or other means to higher administrative levels when those services or supplies are not provided. By empowering communities to hold governments and the health system accountable, ICT sets a chain of events in motion that can lead to an increase in the number and quality of health services and supplies, thereby influencing health seeking behavior.

The impact of ICT on accountability was evident during the creation of a community health worker program in Ceara, Brazil, in 1988. The program began against the twin backdrop of decentralization and rampant local corruption. The state government, which founded and directed the community health worker program, was afraid that funds transferred from the center to the municipalities for expanded health services would instead line the pockets of mayors' political supporters. In order to stem potential abuse, the state government launched mass awareness campaigns, partly using radio, to educate

local communities about the new program and what they should expect from their local political leaders. Building this accountability mechanism using ICT was a critical component in gaining the support of local leaders and in ensuring the program's success (Tendler 1998).

V. Closing Remarks

Today's advancements in ICT offer planners powerful new tools in planning and delivering quality information and services that are crucial to improve maternal and child health. Using these tools—as well as implementing the known interventions to save women's lives—requires political commitment and resources to which both the developed and the developing world have committed in different international and regional forums. Unfortunately, most of these commitments have failed to translate into sufficient action.

The lack of significant progress is especially disappointing because the costs of a comprehensive package of services that would save the lives of millions of women and newborn children every year comes to less than a few pennies on every dollar in income of rich countries—far less than the cost of doing nothing, as maternal deaths perpetuate the extreme poverty, hopelessness and despair that breed conflict and insecurity.

For the first time, we have the critical nexus of knowledge, experience, technology and financial resources to make a difference in the lives of the world's marginalized women and children. History will judge us on our actions—or inaction—and measure our success not by the wealth of a handful of countries or the richness of our technological advances but by the solidarity we express toward the world most vulnerable populations.

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Putting All Our Eggs in one Basket

Bethany Cole

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The Millennium Development Goals (MDGs) were introduced as a global initiative to reduce the vast differentials that exist in socio-economic status and health indicators between countries and between social groups.⁶⁹ They were designed to address disparities of health, hunger, disease burden and inadequate shelter while also advancing gender equality, education and the environment. In total, these goals were established to address extreme poverty and alleviate some of poverty's root causes so that some of poverty's most egregious consequences could be mitigated.

The indicators and targets of the MDGs reflect the goals and priorities of the parties who designed them as much as they indicate global need. Of the eight development goals, the fifth goal (MDG5) is the only one to expressly address women through maternal mortality, specifically to reduce the maternal mortality ratio by three quarters, between 1990 and 2015.⁷⁰ Certainly the deaths of over half a million women in pregnancy and childbirth is unacceptable, all the more so because these deaths are largely preventable and almost exclusively found in low resource countries.⁷¹ The international community, civil society and governments are all accountable to address these disparities and directed focus and energy should be mobilized to concentrate on these gaps.

As important as MDG5 is, it is important to look at which indicators were chosen for the development goals since they reflect priorities. Sexual and reproductive ill health contributes to a third of the global illness burden but is not mentioned in MDG5 or in any other MDG.⁷² In this paper I first address the imbalance of leaving out sexual and reproductive health (SRH) in favor of maternal health and discuss some of the possible motivations for this focus. Then I draw parallels between this imbalance and Information and Communication Technology (ICT) availability. Looking at Nigeria as an example, I underline that many of the challenges and opportunities of ensuring SRH and ICT use and availability for women and girls are similar.

THE BODY POLITIC

Across indicators for socioeconomic status, health or livelihood between women and men, there is a differential unfavorable to women. Additionally women's health is affected by biology and social factors. It is logical and necessary given their status that women would need special consideration due to constraining social mores. But why is this special consideration given for maternal health? Why is maternal mortality the entry for addressing women's needs?

International consensus was reached in 1995 at the International Conference on Population and Development, when 179 countries agreed that an integral component to alleviating extreme poverty was to acknowledge sexual and reproductive rights as a

⁶⁹ UN Millennium Development Goals. Retrieved from Retrieved on February 15, 2006.

⁷⁰ NetAid. From http://www.netaid.org/global_poverty/millennium-development-goals/goals/mdg5.html. Retrieved on February 15, 2006.

⁷¹ How to reduce maternal deaths: rights and responsibilities. DfID. February 2005.

⁷² Germain, Adrienne and Kidwell, Jennifer. The Unfinished Agenda for Reproductive Health: Priorities for the next 10 years. International Family Planning Perspectives. Volume 31, Number 2, June 2005. 90-93.

human right.⁷³ This is apparent because of the great strides made in securing SRH for women around the world and the many positive effects reproductive rights have for women and girls. MDG5 does not include universal access to sexual and reproductive health, despite the advancements these movements have made in securing women's wellbeing. Why is this important, vital component missing?

Health is well protected and defined as a human right in many international human rights instruments, specifically the Universal Declaration of Human Rights and the International Covenant on Civil and Political Rights.⁷⁴ The right to health is outlined in Article 12 of the International Covenant on Economic, Social and Cultural rights. SRH is a component of health and should be given all the consideration and economic support afforded to other aspects of human health. The International Conference on Population and Development in 1994 and the United Nations World Conference on Women, the Beijing Conference, a year later in 1995 both started a movement to "take a broad view of women's sexual and reproductive rights" and confirmed "the centrality of reproductive rights in advancing the status of women".⁷⁵ SRH includes family planning, availability to a full range of quality contraception, abortion, HIV/AIDS, female circumcision, rape and sexual violence and family law. A violation of any one of these or the failure to enjoy access and rights to any one of these constitutes at the minimum a contradiction to international human rights instruments and more tellingly reflects the societal belief that a woman's status is disposable. Even though this list is not exhaustive, maternal health is only one part of the whole that constitutes SRH.

In 1994 at the Cairo hosted U.N. World Conference on Population and Development, a final declaration affirmed that reproductive health "implies that people are able to have a satisfying and safe sex life".⁷⁶ In an international forum, wellbeing and control over one's sexual and reproductive lives was linked. Sexual rights have made worldwide advances during the last 15 years, in some ways forced by the HIV/AIDS pandemic. Sexuality in all cultures is laden with meaning and it is easier to bring consensus around reducing maternal mortality rather than addressing sexual freedoms, a much more complicated and divisive issue.

Marginalizing sexuality in favor of convention and "social conservatism" is rampant and the political movement over other people's bodies is being played out where the people most in need of protection are the most vulnerable.⁷⁷ HIV/AIDS programs heavily promote prevention only through abstinence and fidelity. The United States, the largest donor for HIV/AIDS, drives this programming methodology. The United States Leadership against HIV/AIDS, Tuberculosis and Malaria Act, also known as the President's Emergency Plan for AIDS Relief (PEPFAR) secures one third of its funding for "abstinence until marriage" programs.

⁷³ Germain, Adrienne and Kidwell, Jennifer. The Unfinished Agenda for Reproductive Health: Priorities for the next 10 years. *International Family Planning Perspectives*. Volume 31, Number 2, June 2005. 90-93.

⁷⁴ Center for Reproductive Rights. *Reproductive Rights 2000: Moving Forward*. 2000.

⁷⁵ *ibid*

⁷⁶ Long, Scott. *Anatomy of a Backlash*. Human Rights Watch.

⁷⁷ *ibid*

Three hundred and fifty million couples around the world do not have access to family planning and for West Africa alone from 1994-2000 this translated to 12,000,000 unwanted pregnancies.⁷⁸ The impact of unintended fertility, especially as it relates to the further challenges of HIV/AIDS and poverty, is devastating for women, their families and their communities. In many places in the global South, repressive sexuality policies are relics of colonialism such as the anti-contraception laws in West Africa imposed by France or anti-homosexual sex laws in India imposed by the British. The Women's Convention, adopted in 1979, mandated that "states shall ensure men and women the same rights to decide freely and responsibly on the number and spacing of their children".⁷⁹

It is only after a woman fulfills her biologic imperative through pregnancy or childbirth that she is permitted special consideration even though she endures double standards throughout her life independent of her reproductive history (and indeed, failure to reproduce is often accompanied with its own set of discriminations). It is a shame that this bias is reflected through omission in the MDGs.

ICT AND SRH

There are opportunities for advancing women's health through ICTs and more specifically advancing women's SRH. Before using ICTs as the panacea for ameliorating women's status, it is important to acknowledge and understand how ICTs could improve. Neither ICTs nor SRH rights are gender neutral. Early in the modern family planning movement it became "obvious that birth-control programs were not the sterile, neutral biomedical exercises their designers had tried to make them".⁸⁰ ICTs likewise have implications beyond their technological impact.⁸¹

Gender differentials unfavorable to women are systematic and suggest structural bias. Women and men do not relate to or benefit from technology in the same way.⁸² Because of this, ICTs can perpetuate gender inequality. This gender divide "has implications for every level of knowledge society, including access, training, scientific and technical employment, national capacity building, and women's participation".⁸³ Percentage of internet users among women in the global South show that women of higher socio-economic status may have as much access to the internet as men of higher socio-economic status but that among the poor, internet use among women is virtually nonexistent.⁸⁴ This shows that it is not solely a gender issue; however it is important to

⁷⁸ Center for Reproductive Rights. Reproductive Rights 2000: Moving Forward. 2000.

⁷⁹ *ibid*

⁸⁰ Warwick, Donald. Bitter Pills: Population policies and their implementation in eight development countries. Cambridge University Press. 1982. Page 3.

⁸¹ Gurumurthy, Anita. Gender and ICTs: Overview Report. Institute of Development Studies. September 2004. Page 7.

⁸² Rathgerber, Ruth. Men, Women and ICTs in Africa.

⁸³ Huyer, Sophia and Matti, Swasti. ICTs, Globalisation and Poverty Reduction: Gender Dimensions of the Knowledge Society.

⁸⁴ *ibid*

note that poor women they will suffer disproportionately for the divide. ICT availability and use discrepancies are not isolated to the global South. In the European Union, the average percent of women researchers in engineering and technology is 10, and in the United States 9% of mid-to upper level IT engineers are women whereas 85% of data processors are women.⁸⁵ This demonstrates a women's ubiquitous at entry level positions and their dearth at higher level managerial or technical positions.

Acknowledging that ICTs can deepen the gender digital and knowledge divide should not obviate their use. The international community recognizes the value of ICTs. At the UN World Summit in 2005, making hardware and software available for internet connectivity was identified as a "quick impact initiative" along with such other basic recommendations as providing treated bed nets and replenishing soil nutrients.⁸⁶ Isolation has as dire of consequences as disease and hunger for the poor and disenfranchised and to address one without the other is to take care of the result without paying attention to the structural issues. A recent World Bank report cited that "countries with smaller gaps between women and men in areas such as education, employment, and property rights not only have lower child malnutrition and mortality, they also have more transparent business and government and faster economic growth, which in turn helps to further narrow the gender gap".⁸⁷ Women will have a ripple effect – her family and her community will benefit from her education and use of information and technology.⁸⁸

Using ICTs for health development is not new. Mapping for infectious diseases such as HIV/AIDS, TB, STIs and malaria allow clinicians and policy makers to plan for influx and understand trends. Health information systems allow clinics to follow up and track patients and their histories over time. ICTs are useful in both broad and targeted health communication campaigns for behavior change and information sharing. Of course to benefit from these initiatives, the intended audience must have access to ICTs.

CONCLUSION

Achieving MDG5 will require scaling up. It will require promoting SRH across sectors to ensure these needs are met. Where there is the possibility for gender discrimination, alleviating the plight of the world's poorest women will not occur. SRH, family planning and maternal health must incorporate an HIV/AIDS agenda and consideration. Education for girls must continue to increase. A girl who cannot read will be and stay disadvantaged for her entire life. These conditions are necessary to achieve MDG5 in the broadest sense of providing universal SRH. ICTs are uniquely placed to support and educate women and girls for high impact and help ensure their participation in addressing their SRH needs.

⁸⁵ Hafkin, Nancy. Some thoughts on gender and telecommunications/ICT statistics and indicators. International Telecommunication Union. 16 January 2003.

⁸⁶ Sachs, Jeffery. Financial Times. 27 December 2005.

⁸⁷ *ibid*

⁸⁸ Huyer, Sophia and Matti, Swasti. ICTs, Globalisation and Poverty Reduction: Gender Dimensions of the Knowledge Society.

MDG6: Combat HIV AIDS

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The Importance of MDG6

AIDS is the fourth largest killer worldwide and has become the leading cause of premature death in sub-Saharan Africa and is spreading at an alarming rate in many European countries as well as in several parts of Asia. It has killed millions of people around the world which has added not only to the human suffering but has also reversed the development progress in the countries worst affected by HIV/AIDS which took them decades to come to that level. HIV/AIDS problem is not only a health crisis but also a social and economic problem. Hence it is only appropriate that combating HIV/AIDS is one of the Millennium Development Priorities and has been incorporated into MDG-6. The scale of the problems associated with the scourge and the multi-dimensional approach required to tackle it makes it one of the biggest development challenges of this century.

Global HIV Situation – Focus on Sub-Saharan Africa

The HIV and AIDS epidemic is the greatest development challenge facing the Sub-Saharan Africa today. The spread of HIV, AIDS and TB is the main threat to development in Africa and it is an increasing threat through the rest of the world. Furthermore, the scale of the epidemic threatens to undo all other development advancement. AIDS has already claimed 3 million lives and infected nearly 40 million people worldwide, of which two-thirds (60%) reside in Africa, which accounts for only 10% of the world's population. The current high prevalence levels means that even those countries that do eventually reverse the epidemic's course will have to contend with serious AIDS epidemics for many subsequent years. According to the UNAIDS (2005) estimates there are about 25.4 million people living with HIV in Sub-Saharan Africa in the year 2004. Across the region women are disproportionately affected by HIV. On an average, there are 13 women living with HIV for every 10 infected men and the gap continues to grow. In most countries women are being infected with HIV at earlier ages than men and these differences are most pronounced among young people (aged 15-24 years). Several recent population based studies suggest that there are on an average 36 young women living with HIV for every 10 young men in Sub-Saharan Africa.

ICT in public health: The Larger Role

The role of ICT in the fight against HIV/AIDS derives from its larger role as an 'enabler of social and economic development'. This is in the sense that ICTs are key instruments for aiding the flow of information and knowledge and for connecting together regions and peoples. In the development context this translates into more informed decision making, wider sharing of experiences and best practices, and more efficient programme planning and operations. ICT also adds a dimension of public policy accountability to development goals.

ICTs are the key instruments in bridging the information gap in today's networked world. Specifically in the context of health care programmes ICT has the following four pivotal roles:

- it is a tool for information dissemination – this could range from broadcasting public health messages to dissemination of preventive information, capacity building through online training and informing public policy advocacy through online discussions and debates;
- it is a tool for knowledge sharing on current medical research, breakthroughs in treatment and new approaches in patient care which can be useful for health functionaries, students and researchers;
- it is a key instrument in planning and monitoring of public health programmes, especially at the sub-regional or regional levels
- it is a tool in aiding speedy diagnosis and treatment through remote consultation, monitoring treatment regimes and managing drug logistics for patients in health care programmes.

The past few decades have seen increasingly large scale efforts put in place for combating diseases with a wide prevalence spanning countries and continents, especially with global bodies such as WHO and other global aid agencies and NGOs taking the lead. ICT has been a great facilitator in programme coordination, and documenting results which is very important from the point of view of convincing donors to continue funding the programmes.

Role of ICT in HIV/AIDS Prevention and Mitigation

HIV/AIDS is no longer just a public health problem – its impact has been devastating on entire economies and societies and hence the problem now has profound developmental implications. Perhaps nowhere is this more evident than in Sub-Saharan Africa, as elaborated earlier. Given the scale of the pandemic, its geographical spread and its effect on overall socio-economic development of regions, it is no surprise that the response in terms of HIV/AIDS intervention programmes for such regions/populations has also been on a global scale. Information is key to controlling the epidemic. People need access to information to protect themselves from infection and public health officials. Also, programmers need up-to-date information on the prevalence and spread of the epidemic to control it and design appropriate interventions. “Health related Internet use has been shown to enhance knowledge about HIV and to be correlated with active coping in a study of HIV-positive patients”. ICT is one of the most potent tools to enable this global response. In spite of billions of dollars being committed to the cause every year, no amount of aid effort seems sufficient to deal with the problem at hand. The aim therefore is to maximize the outputs from a given set of inputs. Keeping these considerations in mind, ICT becomes a crucial component in enhancing programme efficiency and cost-effectiveness and maximizing outreach of the existing programmes. This is in addition to its traditional role of a means for routing global information flows, which feed into public policy building, development planning and generating resources for interventions.

"Considering the technology boom and the HIV boom existing at the same time, we need to extend the uses of ICT to assist us in educating our people," said Leon van der Merwe, Managing Director of LearnScapes.

In the context of HIV/AIDS intervention programmes, the following major beneficiaries or end-users of the ICT-based networks and tools can be identified:

1. **Vulnerable groups** such as the youth who learn about prevention of HIV infection through information dissemination tools like websites, online journals and newsletters, training modules, E-discussion groups and helplines etc.
2. **Policy-makers** who use the information and opinion generated through such means as a guide to formulate concrete policies and expediting institutional responses for tackling the disease and arresting its socio-economic implications.
3. **Donors/Aid organizations** who aim to ensure transparency and accountability in logistic, operational and financial commitments on HIV/AIDS interventions.
4. **Programme functionaries** who need to ensure greater networking and coordination between stakeholders to inform programme planning, delivery and evaluation. They also need ICT-based tools for facilitation of intervention programmes through streamlined surveillance systems for better targeting, monitoring and evaluation, besides improved delivery mechanisms. ICTs also provide them a platform for sharing information and knowledge which can feed into better programme delivery in terms of replication of best practices.
5. **Health workers** including doctors, nurses and paramedics participating in clinical HIV/AIDS intervention programmes and who use ICT tools for clinical data management, monitoring patient profiles, drug supplies and other logistic requirements besides facilitating remote consultation in diagnosis and treatment. The ICT for Health Dot Force team⁸⁹ found that “the highest benefits of ICTs are realized by improving access to information and education and communication tools (CD-ROMs, Internet, and distance-learning technologies) for rural and community health care workers”.
6. **Researchers and students** who gain from information networking, online journals and libraries and data on different clinical and non-clinical aspects of HIV interventions which is a valuable input into their research.
7. **People living with HIV/AIDS** who are supported through online counseling and guidance for better care of patients and to remove socially inhibiting stigma and prejudice and enable the HIV positive persons to lead normal lives to the maximum extent.
8. **Other concerned persons**, who are active in building up opinion, pressing for policy initiatives and advocating for a better world for the infected and affected persons.

ICT applications in HIV/AIDS interventions can be categorized into the following broad fields on the basis of their primary purpose and focus:

I. Clinical Programme Interventions:

Clinical application is the most direct use of ICT in HIV/AIDS and consists primarily of primary prevention, clinical data management, supply chain management and client

⁸⁹ The Digital Opportunity Task Force (DOT Force), a collaboration between the United Nations Development Program (UNDP), Accenture, and the Markle Foundation, was established in 2002 to assess and document the mechanisms by which information and communication technologies can be used to leverage social and economic objectives in poor countries.

education. These ends are interrelated since a single system set up for the purpose can meet all of the above requirements. Patient monitoring helps in efficient programme management as well as helps understand disease patterns. Improving logistics support for distribution of drugs (esp. ARVs) is also a very important aspect of ICT use. Many people do not have access to these life-sustaining drugs, because the drug supply chain is inefficient. Another facility which can be added to this is that of telemedicine or remote consultation and diagnosis.

Such systems are essentially based on a local area network and consist of a number of remote computers connected to a central server. Information on patient profiles is entered into a centrally maintained database. At a small scale such systems may initially be hosted by health institutes, and at a larger scale they may consist of a network of such institutes.

Electronic Medical Record (EMR) to support HIV treatment: In a region with low connectivity, infrastructure and very few doctors, expansion of HIV treatment services, especially in the impoverished regions, as well as follow-up of treatments and coordination of drug supplies is a major challenge. EMRs have greatly facilitated this in such areas. Information provided by EMRs can be analyzed to provide valuable inputs to programme planning and implementation based on concrete evidence on the rate and trend of infections. EMRs to support HIV treatment have a history since the 90s as tools for medical information management. The NGO Zanmi Lasante launched an EMR system in the year 2000 in its HIV/AIDS programme in rural Haiti. Access to internet was ensured via a satellite link and a web-based HIV-EMR medical record system was created and hosted on a server in Boston.

The data collected in EMR includes patient histories, laboratory investigations, social and demographic circumstances, drug regimens, treatment histories and assessments. Every care is taken to maintain patient secrecy and data confidentiality. The HIV-EMR has proved to be a useful tool in disease surveillance and monitoring as well, besides also enabling remote diagnosis and consultation on case histories, patient monitoring and sharing knowledge among health workers, often situated in remote difficult to access areas, with this being their only source of credible medical information on their field of work. It also works as an effective tool for demonstrating programme results to the global funding sources and helps generate further resources for the cause.

A similar EMR system was developed in Kenya under a HIV intervention programme by Moi University, Kenya and Indiana University, USA, in partnership. This system holds records of more than fifty thousand individuals. It uses a relatively basic ICT tool to create and manage a patient database system in a resource constrained setting. Detailed records of patients are maintained in similar profile as HIV-EMR of Haiti. On each patient visit paper based patient encounter forms are filled and then transferred to electronic format. EMRs are important monitoring as well as planning tools especially in resource poor settings such as Sub-Saharan Africa, since they help in projecting future needs. They also help in tracking patient adherence to treatment regimes. They help monitor disease patterns – new opportunistic infections, reactions to drugs and other HIV

related aspects. One of the major problems with EMRs is that only data for sick patients or those who seek treatment is captured.

II. Awareness generation, information dissemination and public policy advocacy

ICT is a tool that enables the transfer of information and builds knowledge, which empowers HIV-affected people to make informed decisions and have greater control over their lives. This not only improves quality of life for people affected by HIV/AIDS, but also helps reduce the stigma surrounding HIV/AIDS. This in turn has the effect of increasing the numbers of people who get tested, and if positive, who access prevention, care & support services. ICT can raise awareness of HIV/AIDS and how to protect oneself, which is essential for preventing the spread of HIV.

When conventional education systems are unable to cope with the demands and needs of the population, online education is one way of reaching out and teaching people. Not only does ICT enable the dissemination of information over great distances and allow for the formation of virtual communities but, perhaps most importantly, it does so anonymously. This is important given the high level of stigma and taboos surrounding HIV/AIDS and related subjects, i.e. sexuality, intravenous drug use, etc.

The ICT for Health Dot Force team found that the “Creation and dissemination of preventive public health information is the most critical element in educating the public and specific target groups toward understanding HIV/AIDS and the preventive measures and behavioral changes that can save lives. Community-level application of ICT to support informational initiatives is proving to be the most effective approach. This approach is reliant on more common broadcast technologies, such as radio, television, and video, and other ICTs, such as CD-ROMs and printed material”.

Mass media can play a particularly important role here not only in raising awareness among the general population through mass media, as well as members of high-risk groups. **Radio** is a very important tool in places like Mozambique and Zambia, which lack the infrastructure for other forms of mass media (e.g. the Internet and TV). Unlike TV, radio can be based in the community, which makes it more relevant and sensitive to local needs. In Mekong project, radio soap operas for youth have been developed in local languages and are aired in schools as well as during extracurricular activities and non-formal education programs.

Newer technologies such as the internet increases people’s access to important information, not only by bridging spatial divides but also by providing the user with a high degree of anonymity. Internet also ensures for a greater timeliness of content and ease of data transfer. There are several internet-based forums which help in creating awareness among the population on AIDS prevention. These include online learning modules, e-networks, listservs, blogs, newsletters and journals. This allows not only for customized information exchange but also for better coordination and convergence of efforts to fight HIV/AIDS and the formation of networks and pressure groups for change, which are more effective in catalyzing change. In fact, internet is one of the most effective mediums for the purpose, this is because the age-group most vulnerable to

HIV/AIDS is the youth, and the youth are also the most receptive to the use of technology for information and communication. Hence ICTs help reach the target group more effectively.

SAATHI is a non-profit capacity building organization headquartered in Chennai that aims to strengthen and expand HIV/AIDS prevention and treatment services in India. ICT is one of its main tools for accomplishing this task. In 2000, it created an Online Resource Centre for service providers working in the field of HIV and AIDS to leverage the Internet and other ICTs to disseminate information, enhance knowledge and skills, support networking and foster communities of practice. This Centre has recently been upgraded to include discussion forums on subjects such as nutrition, ART, OVCs and HBC, a digital library, e-training modules, and online support to NGOs in areas of proposal writing, documentation and data analysis. One of its most popular services to date is a list-serve that provides people working in the field of HIV with the most up-to-date information on the character of the epidemic, scientific research and medical breakthroughs, HIV-related legislation & policies, capacity building opportunities and job announcements.

ICT can improve patient literacy and increase demand for quality services. ICT, especially the Internet, can improve access to up-to-date information on care & treatment. This is particularly important in the area of ART which has many complications and side effects. It can provide people with information on the best diets and exercise regimens for maximizing health. The low expense of Internet can allow for the presentation of information in local languages and it can support audio and video formats that for those who are not literate. The Internet can also be an excellent source of information regarding where to go to receive various types of services. Importantly, it can also provide people with information regarding patients rights and recourse to action should these rights be violated.

Some of the forums for knowledge sharing and dissemination could include:

- a) **Internet based discussion forums:** One of the best examples of this is the Nigeria AIDS e-Forum owned by Journalists Against AIDS (JAAIDS), Nigeria. It has emerged as a powerful medium not just for information exchange, but also to inform public policy on HIV/AIDS related issues and concerns. The e-Forum has grown from a modest start as a discussion groups created on yahoogroups to a separate website providing a host of information on all aspects of the disease. It also promotes the rights of people infected or affected by AIDS.

Other examples of internet based information networks are the Health Development Network (HDN) which hosts a number of discussion groups to inform and exchange community-based knowledge and experiences on HIV treatment and care. Other discussion groups focusing on HIV/AIDS in Africa include AfAIDS, SAfAIDS (focused on Southern Africa) and RAISA-NET (Regional AIDS Initiative of Southern Africa). The discussions in these groups are generally facilitated by moderators who ensure the focus of the group and quality of information being circulated. The World Bank-World Links

Organization project ‘World Links’ which has established more than seven hundred school-based internet learning centres piloted a project in which students and teachers participated in a five month online learning course on HIV/AIDS.

- b) **Community Based Knowledge Centres** – these would provide appropriate information to people through traditional means as well as new ICTs such as the Internet. They could serve as platforms for many other HIV- and health-related activities: could house local radio station, could serve as ISP where none exists, could be meeting point for youth groups, etc.
- c) **Internet kiosks:** In India, a corporate house, ITC Limited started eChoupal, an internet kiosk to enable millions of farmers in the country to improve their livelihoods with access to information on growing and marketing their products. Since June 2000, over 5,200 eChoupal internet kiosks have been established to serve 3.5 million farmers in 31,000 villages. At the kiosks, farmers order fertilizer and other supplies at a lower cost, check market prices and sell products online, increasing their income by 20%. eChoupal has now added health and education services to its network of internet kiosks.

E-mail networking has proved to be a very popular medium providing equal opportunity to persons from all walks of life to participate, learn, express concern and exchange views. It is also a highly cost-effective medium. However, in Africa it is still largely elitist because of infrastructure problems.

III. Targeting and Surveillance

ICT can improve the quality and coverage of prevention, treatment and care & support programmes **The ICT for Health Dot Force team** found that “Population health (epidemiology) and research are critical components in the long-term management strategy for HIV/AIDS and other diseases, and offer significant opportunity for exploiting ICT in developing this evidence-based decision-making capability”.

Targeting of AIDS interventions in an area where ICT plays a very important role, especially since the scale of the problem is much larger than the amount of resources available to tackle it. Hence the scarce resources need to be most effectively targeted to reach the population most in need and the requirements most urgent to be met. Computer-aided technologies help process the information available through disease surveillance and monitoring, which in turn produces the regional profile of the disease pattern as well as related socio-economic, demographic and other factors which renders a region or population more vulnerable to HIV/AIDS than others. The ICT with the help of GIS tools can be used as an effective means of identifying vulnerable populations and regions, and also tracking and monitoring the vulnerability profiles over time. This is a major input into effective programme planning as well as impact assessment of interventions. The fundamental requirement for effective targeting is availability of information at disaggregated levels on disease prevalence, risk factors as well as vulnerability indicators pertaining to socio-economic and demographic profile of the region. This information is

then mapped digitally to identify regions and populations most in need of programme interventions on HIV/AIDS.

Several agencies are working at the regional level in monitoring the spread of the disease through epidemic surveillance programmes. PASEi is one such programme operating in West Africa. It has trained regional health workers in epidemiology and computerization. They help transmit relevant information from remote computers across the region which is then used to map the disease pattern. Another example is MAP which has a much wider geographical reach, in that it includes more than hundred technical experts in forty countries who assess HIV/AIDS trends at a global level. Such systems of surveillance are necessary to understand disease patterns and to support health systems to respond according to the scale of the disease.

IV. Human resources / Training and Capacity Building of HIV Service Providers

ICT plays an important role in places where there is scarcity of qualified health care personnel due to the HIV/AIDS epidemic (e.g. Botswana, Mozambique and Zambia). ICT can be a cost effective strategy for reaching large groups of people.

A second aspect is the use of ICT in distance education. Most HIV- service providers reside in countries with little access to scientific developments relevant to their programs. Therefore, it is critical to transfer advances from the scientific arena to service providers on a global scale. A study conducted by Center for AIDS Intervention Research (CAIR), Department of Psychiatry and Behavioral Medicine, Medical College of Wisconsin and the Department of Public Health at the University of Miami found that ICT can disseminate new intervention models to service providers worldwide in a cost effective manner (Distance Communication Transfer of HIV Prevention Interventions to Service Providers; Science 24 September 2004: Vol. 305. no. 5692, pp. 1953 – 1955).

Conclusion

Many voices of concern have been raised on the growing emphasis on ICT in HIV/AIDS programming in the resource-poor setting of Africa. Primarily, the low levels of literacy, infrastructure development, factors of physical, economic and social access as well as linguistic barriers impede the spread of ICT in Africa, particularly in regions where HIV/AIDS is the prevailing debilitating problem. Listed out below are the many challenges facing the spread of ICT as an effective tool to combat HIV and AIDS.

The Challenges:

Ethical Challenge: One of the major concerns is that in places where the immediate needs of basic anti-retroviral drugs, elementary care and nutritional support are also hardly met, the talk of investment in ICT tools seems a luxury. This is an ethical challenge raised by emphasis on ICT use in resource-poor regions, voiced by grassroots level health functionaries. In such regions there is no denying on the priorities that need to be set in meeting health expenditures. And there is also no denying on the pivotal role played by these functionaries, their commitment to the cause and the challenges faced by them. However, at an intermediate level, scarce resources can be employed in meeting

the critical needs of basic infrastructure through which ICT access can be enabled eventually. Equitable use of ICT in HIV/AIDS programming is possible only through integrating the information needs of grassroots functionaries and community health workers in the design for the ICT network / tool.

Lack of infrastructure support: Among the many infrastructure hurdles are the lack of supporting electricity and telecommunication network, poor internet connectivity, lack of skilled and experienced staff for operating ICT systems, lack of documentation and communication setup to support ICTs, and also financial constraints in setting up infrastructure as well as cost constraints in utilization. New technologies like cellular phone networks may help circumvent the problems associated with hard-wired telecommunication structures and ensure greater connectivity.

Lack of ICT professionals: There is also a great need for people who possess the skills to develop and deploy ICT; and human resources to develop appropriate content in the local language. Unfortunately, many of these are in short supply in many of the countries most affected by and vulnerable to HIV due to high illiteracy rates, lack of ICT professionals, lack of infrastructure and limited budgets.

Low/poor access and utilization skills: Access to ICT is a major problem in Africa and poses a formidable barrier to ICT-based HIV/AIDS campaigns. We are well aware of the link between poverty and HIV/AIDS. Hence the focus of HIV targeting needs to be the poorest regions. However, ICT availability is concentrated in a few large towns, mostly capital cities, with virtually no users in the rural areas. The scale of infrastructure problem is evident from the fact that in Africa there is one internet connection for every 200 persons, while the world average is one in 30 persons.

On the whole the people suffer from limited exposure and lack of sensitization towards ICT as an alternative information tool. Indeed, even in places where Internet use is high (e.g. US), low literacy populations have been unable to take full advantage of the health resources accessible through the Internet. Most current health education materials are written at a 10th grade or higher reading level.¹ This means that people with low literacy skills are unable to access or fully understand important information on prevention, treatment and care & support.

Voices in criticism of ICT have also seen it as a means for Northern donors to enforce a top-down approach to problem solving, rather than solutions emerging from the communities themselves. ICTs have also been considered inadequate to address local issues, having traditionally been considered always in the global context.

High learning curve: There is a high learning curve for designing as well as using ICT applications. Professionals who possess these skills often seek employment in the private sector, which pays better. With respect to the Internet and computer applications (e.g. databases), the staff / members of NGOs and community based organizations would require special training not only in designing an ICT strategy, but also in maintaining and using computer hardware and software.

Developing appropriate contents: Another issue in access is the lack of HIV/AIDS related information in local languages. This leads to a poor impact of relevant and vital messages meant for reaching the public through the medium of ICT. In fact, the campaign against stigma, discrimination and denial has lost much ground because of this problem. These problems can be effectively dealt with through dissemination of relevant information in the vernacular, which would have a wider reach and greater impact. There is a great need for more accurate, relevant and easy to understand content.

There is a tremendous amount of information of the Internet, which can overwhelm people. Also, there is a lot of inaccurate information as well. This is a problem for all users, but especially for those with low literacy levels or who are not native speakers of language use. So, there is a need for a one-stop-shopping site or portal that not only provides access to accurate information but also consolidates the myriad of information that is out there into user friendly products such as FAQs, annotated bibliographies, etc. Applications and messages would need to be very simple, intuitive and iconic as many end-users have very little formal schooling.

The Challenge of Economic Access: People may be informed about the ICT tools available, but they may lack the purchasing power to use them, hence economic access is also an issue. Care must be taken to ensure that ICT does not accentuate the growing disparity between the informed and ignorant, the rich and poor. For this it is necessary to intensify spreading ICT inwards from primary and secondary towns to the rural hinterland. It is also necessary to provide a heavy subsidy on such services in deprived regions, preferably providing them free of cost to the rural poor.

Possibilities:

However, voices in support of the active use of ICT tools in HIV/AIDS programming have been forceful on many counts. The implications are simply too large and too obvious to be ignored. The ongoing information revolution has created a favorable environment for ICT to be used to its maximum extent to benefit the end users of the health system, whether we speak of HIV/AIDS or any other health crisis. Networking and information exchange through ICT helps increase the spirit of participation and a sense of responsibility among the stakeholders towards the management of HIV/AIDS, which is not just a disease but a development issue, especially for sub-Saharan Africa. It provides people a voice to contribute to their region's development, thus indirectly hitting at the cause of HIV and AIDS.

Way Forward:

Some of the major implications for strengthening the ICT component of HIV/AIDS interventions include creating an enabling policy and institutional environment, and cooperation between stakeholders and governments at extra-national levels to maximize the economies of scale and long-term programme outcomes.

Any development programme cannot function effectively unless it has institutional backing. At the national level creating institutional capacity is the key to enabling HIV/AIDS intervention with ICT as a basic facilitating tool. At the institutional level this involves two key components – firstly, creating a favorable policy environment and secondly improving coordination between ministries and the various implementing agencies to address the problem at hand in a more effective manner leading to much better programme outcomes. Governments need to mainstream ICT into national response to HIV/AIDS and allocate funds and provide support for development of ICT sector. Countries with ICT expertise and experience in terms of successful low-cost initiatives, like India, could provide low-cost ICT services as well as replicable models for ICT interventions to other developing countries such as those in Sub-Saharan Africa.

Many of the challenges inherent in using ICT to achieve HIV-related objectives could be overcome through increased collaboration between civil society, the private sector and government at the national level. For example, companies specializing in or employing specialists in ICT could second staff to government, NGOs and community organizations for a set period of time to put in place IT systems and train staff to use them. Companies could also make the requisite software and hardware available at affordable prices. This could be built into company's CSR policies and employee volunteer programs.

The cost and policy implications of ICT use in HIV/AIDS interventions necessitate cooperation and joint programming at a macro scale as well. On the technical side this would help develop a core data set and functions uniformly across HIV projects in the regions. This would help disease surveillance and monitoring at a larger scale. In addition, exchange of information would facilitate treatment through knowledge sharing. Of course, there should be the realization that the sharing is not just of information but also of ideas, models and software among the implementing agencies in order to increase programme effectiveness.

Hence there is a need to build partnerships to bridge the Digital Divide and capture the digital opportunity for meeting the MDGs in general and MDG 6 in particular. Initiatives such as the G-8 DOT force and the UN ICT task force with their joint 'ICT Against HIV/AIDS Coalition' are examples of efforts that can be replicated in the African regional context. The main stakeholders would be national governments/ministries, international aid agencies, ICT service providers and HIV/AIDS organizations, among others. Such strategic partnerships at the regional level have the potential for greater commitment and ownership of responsibility for a multi-dimensional response to the challenge of HIV/AIDS and development.

MDG7: Progress toward achieving the MDG: ensure environmental sustainability

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Sustainability is the journey rather than a fixed destination. The concept of sustainability means that the use of natural resources occurs in such a way that resources are not permanently depleted, allowing for their future use. On the journey of sustainability shifting parameters may require alteration of resources' use. For example, population growth and affluence increases the demand for a resource while environmental factors like rainfall and climate may alter availability. Sustainability pertains to renewable resources like forests, fisheries, and water, but is not strictly possible with limited resources, like oil or precious metals. However, the term has broadened from its origins of managing renewable resources to become a dominant discursive theme inclusive of human lifestyles. Part of the term sustainability's popularity is related its malleability of interpretation. Sustainability has been endorsed across societal interests, but environmental NGOs and corporations have different understandings of what that journey entails. The United Nation's inclusion of the Millennium Development Goal (MDG) 'ensure environmental sustainability' is an extremely ambitious goal. This is particularly the case with respect to the tensions between achieving environmental sustainability and continued economic development through the exploitation of natural resources, especially a concern in developing countries. While it is unlikely that environmental sustainability will be globally ensured by 2015, this MDG beneficially challenges the world community to improve sustainability on our journey of development and also monitors progress. This chapter considers some of the challenges of ensuring environmental sustainability, particularly identifying linkages to the themes of economic development, globalization, and regional variability.

The most popularly embraced *strategy* for environmental sustainability is sustainable development. Sustainable development is "a *conception* of sustainability in that it contains views on what is to be sustained, on why, [and] on what the object(s) of concern are" (Dobson 1998, page 60, original emphasis). The reason sustainable development is a popularly supported strategy for environmental sustainability is that it features continued economic development. Our Common Future (WCED 1987), commonly known as the Brundtland Report,⁹⁰ is recognized as presenting the most widely acknowledged definition of sustainable development: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987, page 43). The path to follow on the journey of sustainable development can be interpreted in varied ways by different interests. Crucially for the support of corporate interests, sustainable development can be easily meshed with existing industrialist institutions.

As its nomenclature indicates, sustainable development recognizes the need to perpetuate economic development and seeks to integrate environmental concerns into existing institutional structures, meaning: "The main challenge is to figure out how economic systems might be made sustainable" (Dryzek 1997, page 30). This is particularly challenging because from the perspective of industrialization environmental resources do not have an existence value and are viewed as raw materials that can be exploited for economic profit. Attempts have been made to estimate a value of natural goods and

⁹⁰The report's common nomenclature is in honor of the Commission's chairperson, Norway's Prime Minister Gro Harlem Brundtland.

services (for example, see Costanza, d'Arge et al. 1997), but estimates are crude and, more importantly, there is not a clearly agreed way to universally price environmental goods and services within existing economic markets. Sustainable development is packaged as a 'win-win' for addressing environmental issues and promoting continued economic development.

As a concept, "sustainable development should be credited with providing the story-line around which different key economic and environmental interests could converge" (Hajer and Fischer 1999, page 3). However, linked to the success of sustainable development's popular recognition is a failure to establish clear parameters of its shared meaning. The array of interests that differently interpret how to practice sustainable development have transformed it into an amorphous term with such a gamut of interpretations that the concept can, in some instances, become a platitude that enables perpetuation of the status quo. Torgerson calls sustainable development, "an incrementalist strategy that involves deliberate accommodation with established institutions orientated to the promotion of industrialism" (1995, page 15). The origins of sustainable development are linked to a conception of sustainability, "predicated on the belief that individuals and institutions can be persuaded to accept responsibility for the production of environmental problems and change their everyday practices to alleviate future impacts" (Burgess, Harrison et al. 1998, page 1446). However, this conception has proved elusive through the multitude of meanings ascribed to the discourse and instead sustainable development offers a 'have it all' position on environmental protection and continued economic growth. Sustainable development is a "very functional concept for setting out a common way of talking about environmental issues. Yet its conceptual basis has been weak from the outset" (Hajer and Fischer 1999, page 3). Despite justified criticism, a fundamental contribution of sustainable development is that it brings debates about environment into the mainstream. The discourse, despite its ambiguity, has cemented the basic principle of environmental governance: that economic, social and environmental spheres should be re-conceptualized as inextricably linked.

Popular interpretation of sustainable development has tended to be one of weak sustainability (O'Riordan 2001), which is built on unfettered economic development with only minor modifications for environmental concerns. This approach to sustainability is supported through globalization, which amplifies pressures on environmental resources in various ways. Firstly, is the exploitation of natural resources, like forests, to produce manufactured goods or the conversion of natural landscapes rich in biodiversity to agricultural production. Globalization seeks to exploit economies of scale so also leads to mono-production, where the economic welfare of a community, or even a nation, is dependent on the global markets for a single crop. Developing countries have the largest remaining natural areas, and particularly feature areas rich in biodiversity, such as tropical rainforests. They also provide the greatest wealth of natural resources and low cost labor. Through the pressures of globalization developing countries are encouraged to exploit their natural resources. Secondly, economies in developing countries that use chemicals to enhance agricultural yield or rely on manufacturing or heavy industry can have high levels of pollution, harming human health and contaminating local environment. Thirdly, the transport of goods requires infrastructure and energy, which

has global implications for greenhouse gas emissions. For example, tropical flowers are grown in Kenya and shipped via air transport to major US and European cities. While globalization has clear economic benefits, it also presents challenges for sustainable use of resources and pollution ranging from local to global scales. While organizations such as the International Forum on Globalization endorse finding alternative paths to economic development that reduce exploitation of environmental resources (Cavanagh, Anderson et al. 2002), in practice the economic factors behind globalization make this extremely challenging.

Issues of sustainability also present specific challenges at localized scales in developing countries. Forests are one resource with sustainable development challenges and managing forests sustainably is one indicator the UN uses to monitor the target of integrating principles of sustainable development into national policies and to reverse the loss of environmental resources (United Nations 2005). In rural areas of developing countries forests are both a source of fuel and a commodity that can be sold for income:

Tens of millions of people, mainly in rural areas, depend on forests as a major source of subsistence and cash income, while hundreds of millions of people depend on forests to supplement their livelihoods. This presents both problems and opportunities. On one hand, poverty can lead to overutilization and degradation of forest resources. On the other hand, the very reliance of people on forest resources may encourage sustainable forest management that could contribute to improved livelihoods for many (United Nations 2005, page 1).

The most threatened forests are in tropical regions in developing countries, which are also forests rich in biodiversity. From 1990-2000 the loss was particularly large in tropical forests with a decrease of 14.2 million hectares per annum and 0.4 million hectares per annum in non-tropical areas, which is an overall decline from 30.3% to 29.6% of the earth covered in forests (United Nations 2005). The MDGs promote sustainable forestry management, which includes both the extent and the quality of forests.

While forest area has declined overall in tropical regions, there exist some positive examples of sustainable forest management. One such example I have observed is Jozani Forest on Zanzibar Island, Tanzania. It is the final stretch of indigenous forest in Zanzibar and the last remaining home to the endangered species, Kirk's red Colobus monkey. The government designated Jozani Forest as a nature reserve in 1960, but the forest continued to be harvested by local villagers for fuel. The late 1990s witnessed a crucial change in the management scheme of the reserve with greater involvement and economic benefit for local villagers. As the home of the rare red Colobus monkey the forest proved viable as an eco-tourism attraction. Locals from villages surrounding Jozani are employed as tour guides and monies collected from visitor fees are then used to support economic development initiatives in the surrounding eight villages. The introduction of direct economic benefit to the local inhabitants provided an incentive for the villagers to cease using wood from the nature reserve because they obtained benefit from maintaining the resource for eco-tourism. In the context of developing countries rich in biodiversity but economically poor, it is both inequitable and unrealistic to expect

locals to cease using a resource because the resource and its role as habitat for biodiversity has value to the international community. Jozani provides a compelling example of the difference of local communities receiving an alternative economic benefit from the sustainable management of the forest. Eco-tourism offers one possibility, but eco-tourism is not a panacea because it may not be viable, threaten the degradation of the resource, or alter the local community (Duffy 2002).

The example of Jozani Forest emphasizes that sustainability initiatives require local support and benefit. This engagement with local communities has a strong history within the environmental movement and retains importance in finding approaches to sustainable development that are appropriate in different socio-cultural contexts. Often called the 'grassroots' environmental movement, the concept of environmental justice is tied to bottom-up social justice movement and history of political action at a local level. The emergence of environmental justice can be traced back to the United States' Civil Rights Movement in the 1960s, led by Martin Luther King Junior. He preached and led the practice of peaceful resistance at a grass-roots level to protest social injustice of segregation in the United States. The principles of the movement expanded to include social justice for all people, regardless of race, ethnicity or religion. The environmental justice movement emerged as a powerful strand of social justice that linked together the socio-economic with the environmental (Harvey 1996). Environmental justice has been explained as the practice of coordinating grassroots efforts: "The grassroots environmental movement is better named the environmental justice movement. Transcending the grassroots, environmental justice applies to the scale of humanity in its appeals for both distributive and procedural justice" (Towers 2000, page 23). Distributive justice entails debate about the equitable allocation of resources. Although equitable allocation is frequently associated with questions of the distribution of environmental 'bads' such as locating land-fills or nuclear power plants, the remit of distributive justice also includes equitable allocation of environmental 'goods', like clean water or green spaces (Dobson 1998). Procedural justice addresses how decisions are made and includes the demand for public participation in environmental decisions at local and regional levels (Lake 1996). Procedural justice includes, "broadening the range of respected knowledges in the public realm and by allowing those with limited voice to exert greater influence on decisionmaking outcomes" (Bloomfield, Collins et al. 2001, page 502).

Hence, in the journey of sustainability the idea of environmental justice integrates intra-generational equity with sustainable development's concern about inter-generational equity. Environmental justice today has resonance amongst people in developing countries working to protect the sustainability of their local environment and culture, often in response to globalization. For example, linked to activities of globalization, seed varieties produced through local sharing have been patented and pricing mechanisms through free trade can threaten the viability of local production of food (Shiva 1997; Shiva 2001). In developing countries local production of agriculture is often the basis of the local economy, allows for self-sufficiency, and avoids the expense and negative environmental effects of transport. The environmental justice movement in developing countries also points to the importance of local involvement in the use of technology.

While technology can offer improvements for sustainability, technology alone is insufficient without the mobilization of the involvement of local communities. One example is the use of small solar panels to replace batteries in rural communities. The use of the solar panels requires the support of local individuals and the sharing of knowledge, ideally by trained individuals in the local community, about how to use this basic technology.

Governance of water resources is another example of a sustainability issue that benefits from local involvement to design solutions appropriate to different locations. Water is necessary and not replaceable for the survival of humans and environment. Water has been identified as a basic human right, but also water supply has been privatized in some locations, including in developing countries. While privatization has been beneficial for reducing the waste of water through pricing mechanisms in some locations, in other locations the pricing has proved to be unreasonable based on local per capita income and socio-cultural response. The most well known example where privatization was contested and overturned through protest by a local community is Cochabamba, Bolivia. Water availability and quality is an MDG indicator with a target of reducing by 50% the people without sustainable access to safe drinking water and basic sanitation by 2015. Notably, some progress has made towards meeting the target of safe drinking water with 83% of the world's population using improved drinking water in 2002, compared to 77% in 1990. These percentages signal 1.1 billion people gaining access to safe drinking water. However, 1.1 billion people still have unsafe water supplies (United Nations 2005).

While progress is being made on achieving the target for access to safe drinking water, meeting this target, like achieving other sustainability targets, is further complicated by population growth.

Globally, achieving the target on improved water supply means that, by 2015, the percentage of the world's population *not* using improved water sources will have to decrease to 11.5 per cent. Because of population growth, this means that 6.4 billion people will need to be covered, up from the current 5.2 billion. Access will need to be provided to an additional 1.2 billion people – The equivalent of establishing new water supply services for about 300,000 people each day until 2015 (United Nations 2005, page 11).

Regional variation also exists with the least coverage in Asia and sub-Saharan Africa. For example, China has almost 300 million without access to safe water supplies (United Nations 2005).

The target of basic sanitation is proving slower to achieve than clean water. In 2002, 2.6 billion people or 42% of the world's population was without adequate sanitation facilities (United Nations 2005). Lack of sanitation and access to clean drinking water causes increased risk of disease and death, notably infant and childhood mortality rates. Difficulty in accessing clean water also has a gender dynamic. In developing countries women and girls are tasked with gathering water from remote sources. The time spent

walking to collect water translates to less time for them to undertake higher-level tasks, for example limiting girls' ability to attend school. While the world is globally on track to meet the clean water provision, if the 1990 – 2002 pattern of improved sanitation continues the world will fall short of the target by more than 0.5 billion people. The regional situations are the most severe for both of these targets in sub-Saharan African and Asia (United Nations 2005).

The meeting of water and sanitation targets has also shown better improvements in rural than urban areas. This suggests the additional challenge of how to address the sustainability of urban areas, particularly since 2005 signaled more than 50% of the world's population living in urban areas.⁹¹ Additionally, projections have the majority of population growth in the next 30 years occurring in urban areas of developing countries, with an anticipated 21 'megacities' of over 10 million people with 17 in developing countries (Gilbert 2002). Rapid growth of developing countries' urban population raises a third sustainability target of achieving an improvement in the quality of lives of at least 100 million slum dwellers by 2015. Aligned with growing urban populations is a growth in slum dwellers in developing countries by 200 million people from 1990 - 2001. During that same time period, as a percentage of urban population the slum inhabitants of developing countries decreased from 47% to 43%. While the improvements to the quality of life for 100 million slum dwellers will be met by 2015, the phrasing of this target masks the growth in absolute numbers. The problem is particularly acute in some regions. For example, "In sub-Saharan Africa, the proportion of the urban population living in slums, 72 per cent, has remained unchanged during the decade, while the size of the slum population grew by 66 per cent over the same period, reaching 166 million in 2001" (United Nations, 2005, page 15). The target of improving the quality of life for slum dwellers illustrates the linkages between human health, education, clean water and adequate sanitation as well as the local environment.

Indeed, the targets for the MDG 'ensure environmental sustainability' relate to the other seven MDGs and demonstrate the connectivity of the goals for an overall better future. Some notable progress has been made towards the specific targets that are the indicators for the goal 'ensure environmental sustainability' but challenges also remain because growing population, particularly in developing countries, means the threshold for achievement of the targets is continuing to increase. This continued modification of parameters, such as population, as well as natural variations in rainfall or weather means that the world community needs to continue on its journey to sustainability with commitment and flexibility of approach. Continuing to protect existing natural conservation areas and setting aside new areas for land and marine conservation are important to protect the Earth's natural environment and biodiversity. At present 11.8% of the world's land and 0.5% of marine areas are protected (United Nations, 2005). Finding sustainable solutions that also have economic benefits is an important step towards making sustainability mainstream. For example, higher oil prices have seen a shift in US consumer interest from large SUVs towards vehicles with greater fuel efficiency and, crucially, also make research and design of improved fuel efficiency

⁹¹ For more details see the Population Resource Center:
<http://www.prcdc.org/summaries/worldpop/worldpop.html> [January 30, 2006].

vehicles and innovation of alternative sources of energy economically attractive (Reiss 2005). While it is unlikely that all the targets of the MDG for 'ensure environmental sustainability' will be met by 2015, the goal provides a focus for continued improvement and a means of monitoring that journey.

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MDG8: Global Partnership for Development

A Tale of Two Continents: Asia and Africa in Global Partnership for Development

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In an age of interdependence, global citizenship – based on trust and a sense of shared responsibility – is a crucial pillar of progress.
- Kofi Annan

Introduction

The *eighth* Millennium Development Goal (MDG) focuses on Global Partnership for Development which translates into an open, rules-based, predictable, non-discriminatory trading and financial system. The achievement of this goal hinges on a demonstrated commitment to achieve the triple bottomline – good governance, holistic development and poverty reduction.

From fairer trade rules and debt relief to access to beneficial new technologies and productive work for the youth, global partnership for development calls for greater accountability of governments to their citizens, sound policies that will have positive impacts on peoples' lives, and genuine public-private sector partnerships. At the national, regional and global levels, this partnership demands that states and governments should improve their national capacities to design and deliver policies as well as achieve results. This global partnership for development is crucial to the success of the first seven (7) MDGs.

Nowhere is the promise of development through a global partnership more evident than in Asia and Africa – home to the world's biggest population and more importantly, the center of the world's development challenges.

It must be said, however, that there is a level of skepticism in Asia and Africa in achieving the MDGs by 2015 because of internal political instability which exacerbates economic woes. The challenge, therefore, is to help governments understand that MDGs is a new approach to partnership with key stakeholders in achieving an inclusive, holistic and sustainable development. The MDGs serve as benchmarks for assessing a government's progress in effectively addressing poverty. Each MDG commitment is a government's pledge to its own people.

This paper examines the development challenges, prospects and conditions for both Asia and Africa to achieve the MDGs through creative and constructive global partnerships for development.

Development Debacle

Asia and Africa witnessed (and still witness) the scourge of world and civil wars, ethnic conflicts, diseases, man-made and natural disasters, and extreme poverty. Both continents experience(d), in varying degrees, low levels of human capital, weak public institutions and high levels of inefficiency.

The consequences of destruction and institutional weaknesses have been far-ranging in Asia and Africa: economic displacement, slavery, human smuggling/trafficking, drug trafficking, prostitution and pornography, kidnappings, organs-for-sale and other transnational organized crimes (TNOCs) and high debt burden.

In the international arena, whether at the General Assembly of the United Nations in New York or trade negotiation sessions of the World Trade Organization in Geneva, both the Asia Group and the Africa Group have been strong allies in addressing security and economic agenda items.

Unfortunately, many countries in Asia and Africa also share ‘billing’ in major negative lists which include Transparency International’s (TI) *Corruption Perception Index*, Financial Action Task Force’s (FATF) *List of Non-Cooperative Countries*, the U.S. Government’s (USG) List ranging from *Tier on Trafficking in Persons (TIPs)* to *Priority Watch List of Intellectual Property Rights (IPR)* violators, the *Failed States Index*, among others.

The development story, however, for Asia and Africa is one of dramatic contrast.

On the one hand, the remarkable success of many Asian economies (East and Southeast Asia economies) has achieved universal claim: that the Asia-Pacific region is regarded as a ‘growth center’ of the world. The high growth rates achieved by these miracle economies over a long period were significantly fostered by their active participation in the globalization process, starting with the liberalization of their domestic economies. Leading the Asian economies are Japan (still the second largest economy in the world), China and India (now dubbed as economic powerhouse, “Chindia”), followed by the four (4) Newly Industrializing Countries in the 1980s: South Korea, Singapore, Hong Kong and Chinese Taipeh (Taiwan). Third wave NICs such as Malaysia, Thailand and to a certain extent Brunei, the Philippines, and Indonesia, are also cited for their remarkable economic growth. Yet many of Asia’s (including the Pacific) 700 million people still earn less than US\$1.00 a day, and more than two-thirds of the world’s poor live in the region.

On the other hand, Africa embodies such an extreme range in reputation: from “cradle of humankind” to “poverty, tribalism and AIDS”. There are only ten (10) countries in Africa considered rich (i.e., with annual per capita gross domestic products over US\$3,500) – Egypt, Libya, Tunisia, Algeria, Morocco, Swaziland, South Africa, Botswana, Namibia and Gabon. Nigeria has rich oil deposits yet most of its people survive on less than a dollar a day. The major challenge facing the continent are the debt problem, poor governance, peace and security, and disease burden, particularly HIV/AIDS and Malaria. Development analysts refuse to relegate Africa as a continent doomed eternally to wars, poverty and pandemics (see Box 1).

The daunting development challenges in Asia and Africa offer opportunities to pursue strategies to achieve growth and poverty reduction.

Box 1. What is the best case for Africa's future?

If the continent can overcome its health problems and the corruption that plagues many of its governments and institutions, then it could take advantage of today's globalized, technological world in much the same way that China and India are now doing. Technology could give Africa the connections that its geography, particularly its rivers, long denied it. Nearly half of all African countries are English speaking, an advantage in trade-relations, and an educated, English-speaking workforce could well attract service jobs to many African countries.

If Africa is to head into a bright future, outside investment will continue to be needed, at least for a time. The cost of perpetual aid to or military intervention in Africa is thousands of times more expensive than solving health problems and supporting local development, thereby heading off conflicts. No only Africans but the rest of us will be healthier and safer if Africa's nations increasingly take their places as peaceful and prospering members of the world community.

Source: *National Geographic Special Issue on AFRICA*, September 2005

Globalization and Global Partnerships

In the face of widespread changes in international relations, promoting Global Partnerships simply means investing for development – ensuring that globalization positively impacts on the people.

Seen as a multi-faceted and contradictory, globalization, at its basic level, is an economic process with political consequences. A key aspect of the globalization process is the adoption of common practices and standards. It is about opportunities arising from reorganizing governance, the economy, and culture. And from an institutionalist point of view, globalization would not unfold if states and non-state actors (e.g., multinational corporations or MNCs) did not sponsor this process.

The governments in Asia and Africa, therefore, are in a position to pursue strategic partnerships to address their development needs. Donor countries such as G8, multilateral institutions such as the Asian Development Bank (ADB), the African Development Bank (ADB), the World Bank, the UN Development Programme (UNDP), European Union (EU), and even MNCs such as Citibank and IBM), are now investing in some or all of the MDG focus areas: poverty programs, primary education, gender equality and women empowerment, child mortality, maternal health, pandemics and other diseases, and environmental sustainability.

In the developed world, the United States, since 2002, is leading the promotion of Global Partnership for Development via its *Millennium Challenge Account* (MCA), effectively

increasing U.S. development assistance by more than 50 percent or a US\$5 billion increase in assistance over current levels by FY 2006. Managed by the Millennium Challenge Corporation (MCC), under the U.S. Department of State, MCA invests in countries that rule justly, invest in their people, and encourage economic freedom. Key areas of focus for the MCA “Compact” include agricultural development, education, enterprise and private sector development, governance, health, and trade and investment capacity building. Eight (8) of the 12 eligible countries in the MCA’s main program funding for FY 2005 are from Africa (i.e., Benin, Ghana, Lesotho, Madagascar, Mali, Morocco, Mozambique, Senegal), while only two (2) countries in Asia (i.e., Mongolia and Sri Lanka) made it in the list.

At the World Trade Organization’s (WTO) Fourth Ministerial Conference in Doha, Qatar in November 2001, the *Doha Development Agenda* (DDA) was launched to improve conditions for worldwide trade and investment. The DDA hopes to achieve a fuller role in the pursuit of economic growth, employment and poverty reduction. Both the Asia and Africa Groups are active in pushing for better terms in achieving a broad development agenda ranging from agriculture, services, intellectual property, to WTO rules (subsidies and regional trade arrangements), trade, and the environment.

At the United Nations, the Philippines recently proposed a debt-swap scheme called Debt-for-MDGs which was supported by many developing member countries. Despite objections of several developed countries, this proposal should be continuously pursued and unanimously supported. In particular, the Africa Group could help lobby for this initiative given its success in negotiating for debt relief from the G8 countries.

In the aforementioned examples of Global Partnerships for Development, albeit limited, it is incumbent upon the governments in Asia and Africa to design innovative policies and out-of-the-box solutions to address their development financing needs, step up their domestic resource mobilization, maximize Official Development Assistance (ODA) and improve the levels of Foreign Direct Investments (FDI). These will certainly improve the competitiveness of many Asian and African economies.

Overall, there is a need for renewed commitment of development institutions and national leaders to engage in existing and emerging global partnerships to help achieve the MDGs.

ICT is Key: Some Innovative Cases

Investing in Information-Communications Technology (ICT) for education and development is a crucial element in achieving the MDGs.

In countries like the Philippines and South Africa, the business communities have transformed their business models to address social and environmental challenges. Whether through corporate-community partnerships or link-ups with the national government, these enlightened businesses are helping to achieve the MDGs not only as a

matter of corporate social responsibility (CSR) but also as a matter of corporate citizenship, based on innovation, value creation and competitiveness.

Take the case of Microsoft Corporation’s Bill and Melissa Gates US\$1 billion Foundation which invests in medical and health programs in China and India, the two main sources of the company’s software engineers and key Asian markets for its cutting-edge products. Another is Citibank’s computer literacy programs in many of its top markets in Asia. Such strategy not only ensures brand recall but also serves as an investment in the future of young professionals whether in electronic banking or software development.

Some companies in East Asia invest in e-learning to supplement the lack of school teachers and facilities for students in a given city or village. Still others use ICT to convey their policy advocacies either in preventing HIV/AIDS in the workplace or in promoting Anti-Tuberculosis (TB) / Anti-Malaria programs.

In January 2004, the Philippine business community led by the Philippine Business for Social Progress (PBSP), in cooperation with the UNDP Manila and the National Economic Development Authority (NEDA), came up with a *Strategy Mix for Business Contribution to the Millennium Development Challenge* (see Figure 1).

Some specific strategies for the ICT agenda are as follows:

Table 1. Business Strategy Mix for ICT Agenda

Core Business Initiatives	Social Investment	Policy Advocacy/Dialogue
Address technology divides by using core business to create virtual classrooms and introduce new learning curricula through cabling technology; provide access to the Internet to help SMEs build their competitiveness.	Support capacity building of local community and local government units as development partners and help strengthen local structures and systems that help provide favorable environment for business and social security for communities through training and value formation.	Advocate corporate triple or integrated bottomline reporting and disclosure. More and more companies are expected to develop reports that highlight the impact of their social and environmental footprints. Of late, media and entertainment (M&E) companies are tasked to reform and subject their ethical actions to the highest standards of social accountability based on the “brain print” they leave on their audiences.
Promote sustainable		

production and
consumption by
implementing clean
production and sharing
accountability to the
environment with
customers through
education/awareness.

Whatever strategy mix that will be adopted by governments in Asia and Africa, in partnership with the business sector and civil society, it should be focused on policies that promote economic freedom, providing an environment conducive to trade and entrepreneurial activity, which ultimately generates economic growth. ICT should be the engine that drives this growth.

Prospects for Global Partnerships for Development

For Asia and Africa to truly harness Global Partnerships for Development, the following action points should be pursued:

- *Combat Corruption.* Governments must be open and transparent, establishing accountable budgetary and accessible decision-making processes. Corruption undermines economic development and poverty reduction efforts. It can erode political stability and deters local and foreign investments. Anti-corruption reforms are essential and require political will, involving major stakeholders in society.
- *Promote the Rule of Law.* Promoting fundamental and universal human rights, establishing democratic institutions, and ensuring sound, predictable and transparent legal systems are important for the rule of law to effectively flourish in Asia and Africa.
- *Invest in People.* There is widespread consensus that investment in human capital is key to economic development. Asian and African Governments must devote their resources, regardless of class, gender and ethnicity and even religious persuasions, to education and health care.

These action points underpin the importance of good governance which, in turn, sets the condition for sustainable development, which then translates to investing in peace.

The prospects for Asia and Africa to achieve MDGs through strategic partnerships not only at the global but also local and regional levels are high, provided that changes in governance are in place – building private-public partnerships and creating a stronger investment climate, with greater investor confidence.

Multilateral institutions and partner countries and even partner corporations must, therefore, support the vulnerable economies in Asia and Africa to adjust to the new opportunities and challenges presented by a dynamic world trading regime.

Institutional frontliners for MDGs in Asia and Africa (the ADBs or Development Banks in both continents) could facilitate this partnership process through peer-to-peer learning sessions from select countries. Governments in Asia and Africa should be assisted in building their national capacities to establish a direct link between a proposed development project/program and MDG targets/indicators that are country-specific. This is crucial in assessing progress in achieving MDGs, especially poverty reduction.

Conclusion

The development challenges facing Asia and Africa are truly daunting and complex. Creative, innovative solutions and comprehensive steps are required to achieve the Millennium Development Goals, not as part of an international partnership agreement among nations but more as a politico-socio-economic and even moral obligation of a country to its citizens.

The Global Partnership for Development, a recognized new approach to strategic development partnerships with performance measures, integrates all the seven (7) MDGs and ensures greater accountability and efficient use of resources.

The success of this partnership in Asia and Africa lies in good governance, driven by investments in ICT, and shaped by the ability of governments to combat corruption, promote the rule of law and invest in their people.

With its impressive diversity, important natural resources, and the resilience of their people, governments in Asia and Africa are poised to realize a significant number of MDGs by 2015, especially in achieving primary education and eradicating extreme poverty and hunger. The additional ingredients necessary to make this happen are political will, effective public-private partnerships and demonstrated commitment of all stakeholders.

Ultimately, these conditions and ingredients, set against the backdrop of a globalizing world economy, will redound to sustainable peace and development in both continents. As the Commission for Africa succinctly puts it in its March 2005 Report entitled, *Our Common Interest*, “Investing in development is investing in peace.”

Development models may differ and brands of government policy activism may vary, but the strategic Global Partnerships for Development could finally be the key in fulfilling the development promise of both Asia and Africa.

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Part 2: Technologies for development

2.1 Stimulating development from the “bottom of the pyramid”

Low-Cost technologies and micro-finance

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⁹² The views expressed are those of the author(s) and do not necessarily reflect the policies of the Commission of the European Union.

Low-cost mobile communications offers new opportunities for widespread economic and social development through the empowerment of large numbers of poor people at the “bottom of the global wealth pyramid”.

The mobile phone is currently the technology with the greatest impact on development. Use is growing fast, even in the poorest countries, often with new business structures. New assessments⁹³ show the crucial role of communications systems as engines of growth; greater in developing than developed countries – with an increase in use by 10% of the population increasing GDP growth by 0.6%. Experience in Africa shows that they can also cut transaction costs, notably for small businesses and individual entrepreneurs; avoid the need to travel for information; and broaden market networks. The social and entrepreneurial benefits are even greater than the economic benefits: mobile phone strengthen social networks – family and friends, and contribute to personal security.

Two-way communication is more effective than one-way communication : broadcasting or access to the web; and the value to people is inversely related to their prosperity: In South Africa, people spend 10-15% of their income on mobile communications, compared with 5% in the developed world, and access to business information is particularly important. If a phone call can save a bus-journey, it not only saves money, but time. In the informal sector, over 90% of entrepreneurs in Egypt use mobile phones.

The utility of mobile voice communications is wider than that of key-board-based e-mail for a number of reasons: It is accessible to the illiterate and those without keyboard skills; It is inherently multi-lingual: any language can be used in a local social network; The handsets are easy to use; They can be very cheap; they are light and can be carried easily; Energy use is very low, and occasional battery re-charging is possible from local and renewable energy sources.

World Bank now estimates that 77% of the world’s population lives within range of a mobile network and access could be provided to 50% of the population by 2015. In January 2005, the total number of GSM subscribers passed 1.28 billion. A further cost-reduction by a factor of 4 will be needed to make personal communications affordable for the next 2 billion, with potential to reach over 3 billion as hand-set and service prices are further cut.

Celtel now has over 5 million customers in 13 African countries; Vodafone and MTN have over 14 million each. In Tanzania⁹⁴, 50% of people in the villages know and have used mobile phones; a further 45% know of them but haven’t used them; despite that only 5% actually own one. The number of subscribers has grown from 50,000 to 2

⁹³ by Prof. Leonard Waverman of the London Business School in the recent report on the impact of Mobile Phones in Africa www.vodafone.com/assets/files/en/AIMP_09032005.pdf

⁹⁴ from the “Growing Sustainable Business” initiative of the UNDP, ILO and UNIDO

million in 6 years to 2005⁹⁵. Over 50% of the population intend to buy one when affordable.

The new major investments in the new low-cost systems are being made by the European, US and Japanese leaders in technology development, and will extend the market well beyond the 2 billion subscribers projected with current technologies. The drive to lower costs has been largely driven by the industry itself, in recognition of the enormous market potential in developing countries. The GSM Association has managed collective “calls for Tender” for 6 million \$40 handsets, for which delivery began in April 2005. It launched a similar collective tender for \$30 handsets in 2005, again combining the market power of operators in developing countries. In June 2005, Philips launched a global initiative to develop sub-\$5 hardware and software platform to drive handset costs below \$20 by 2007 and below \$15 by 2008. This could extend the customer-base beyond 3.3 billion

Low-cost technologies are not low-tech. Low retail and usage costs come from greater electronics integration and miniaturisation; greater energy and spectrum efficiencies, and the optimum use of the competitive advantages of all world regions in the supply chains. Low-cost mobile technologies incorporate the latest innovations for Third Generation systems. Therefore, investments in next generations in Europe and the developed world, have major impact on developing countries.

Low-cost services also require the right regulatory and investment climate: In 2003, 73% of African countries had competitive operators in mobile communications, and by 2004, 40 had a regulatory authority – up from only 5 in 1992. Competition has benefited even the poorest countries: the Democratic Republic of the Congo has 15 times the usage of mobile communications, compared with Ethiopia, even with a comparable level of GDP per head, because of competition between three GSM operators.

However, the regulatory and investment environment must also enable the development of innovative business models – notably of shared use of mobile communications in poor communities; but also for a wider range of mobile services – such as cheap and secure payments and messaging. For example:

- “Phone Ladies” in Asia and Africa are the focal points of contact of whole communities that relies upon them to keep in touch with relatives in the outside world; to do business and a vital link to emergency services. They are key clients of microfinance, and a vital first step to many new business initiatives: Bangladesh’s GrameenPhone now has more than 5 million subscribers.
- Nigeria’s “umbrella people” have made a success of reselling call-time to those for whom their own phones are still unaffordable;
- WIZZIT is a phone-based banking facility for which no bank account is required and is completely pay-as-you-go. It works almost everywhere in South Africa; there are no monthly fees, and all costs are transaction-based. 800-plus “Wizz Kids” have been deployed to low-income communities to help people sign up;

⁹⁵ Sunday News, Tanzania: 6th February 2005.

- In South Africa, Celtel operates a service which allows credits to be transferred by phone, allowing family members to send credit back to relations in villages.
- In February 2006, Motorola added a credit-card capability to its low-cost phones : The M-wallet technology allows users to pay bills, purchase products and services and to transfer money.

These links to financial services are crucial to empowering local entrepreneurs, and to mobilising the enormous development potential of remittances from expatriated family members: In Africa, the total remittance from diaspora workers is about \$17 billion per year (in 2000-2003), larger than foreign direct investment (about \$15 billion per year) and comparable with Overseas Development grants and loans – about \$25 billion per year. In some African countries, remittances represent as much as 27% of GDP. Worldwide, remittances are about twice the total of Official development aid. However, transaction fees are high in traditional banking systems: They can average 6-13%.

The European Commission proposed a “strategy for Africa” in October 2005. It includes specific proposals to *bridge the digital divide* in the framework of the follow-up to the World Summit on the Information Society (WSIS). These include supporting the development of advanced and low-cost technologies for electronic communications and the development of regulatory frameworks to create a sound business environment for innovation, growth and social inclusion. The Commission also proposed that by acting as early adopters of new technologies, national research and education networks can develop new and innovative methods to overcome inadequacies of the market, e.g. by developing cost-effective communications solutions. The successful model used in north Africa to link these networks with each other and to GÉANT in Europe is being extended to the Sub-Saharan countries. The overall objective of these measures should be to bridge the digital divide at all levels – within countries, between countries and regions as well as between Africa and the rest of the world.

2.2 Telecommunication Networks

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Introduction

I would like to highlight here what I consider an historic opportunity for less developed countries to improve the rates of economic growth, and raise their countries to the first positions in life quality and productivity.

In order to offer to the reader an interesting and pleasant text, I will detail a few, but the most important concepts in communications networks access.

Starting with a geography and demography brief to establish the framework, I will continue defining a few important concepts in relation with access technologies to networks. I will finish the essay exposing how much important is for countries the investment in communication networks infrastructures as a support platform over which bring their economies among the most prosperous of the world, and contribute to reduce social inequalities in their populations.

I hope the readers would find in this text a first bath in communication networks that would open their hunger of knowledge on telecommunications technologies and information systems.

Africa Geography and Demography

Africa is the world's second-largest and second most populous continent, after Asia. At about 30,370,000 km² (11,730,000 sq mi) including its adjacent islands, it covers 5.9% of the Earth's total surface area, and 20.3% of the total land area. With over 840,000,000 people (as of 2005) in 61 territories, it accounts for more than 12% of the world's human population.

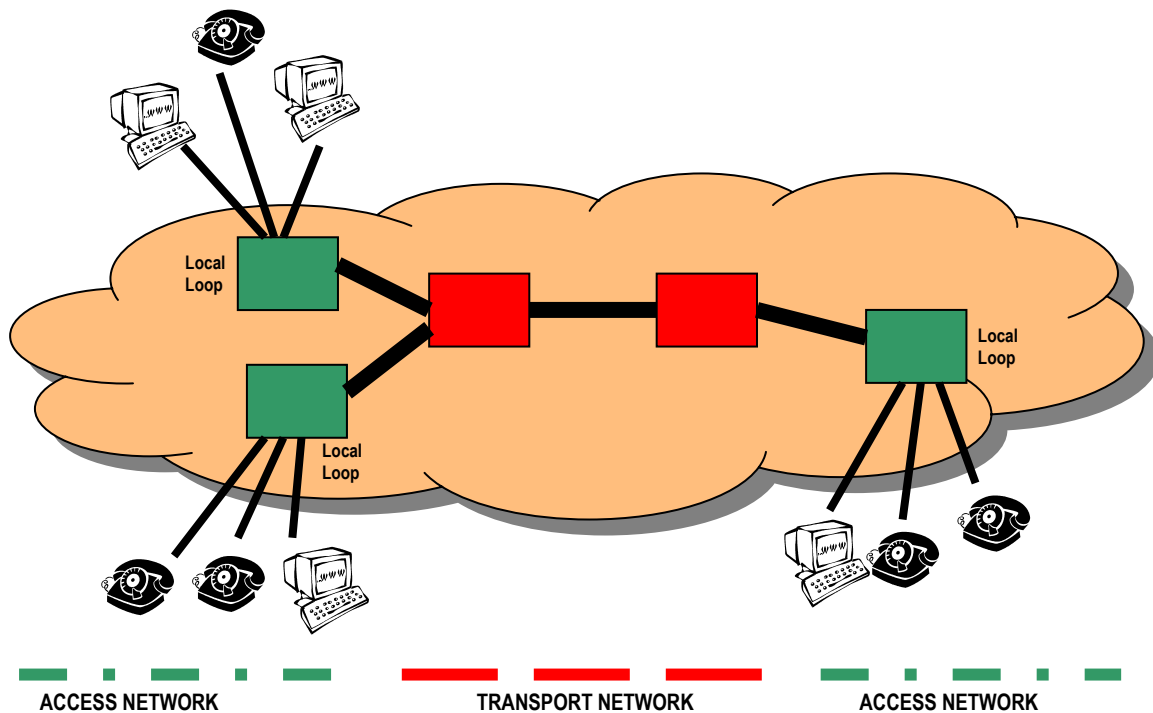
Africa is the largest of the three great southward projections from the main mass of the Earth's surface. It includes within its remarkably regular outline an area, of c. 30,360,288 km² (11,722,173 mi²), including the islands.

The Federal Republic of Nigeria, in West Africa, is the most populous country in the continent, with a population of almost 140 million people comprising of over 250 ethnic groups, approximately a fifth of the continent population. Nigeria is a blend of exciting cultural diversity that has produced a land of unparalleled opportunities. Though less than 25 % of the Nigerians live in urban settlement, and at least 24 cities exist with population bigger than 100.000 inhabitants.

Located just above the equator with a coastline stretching over 800 miles, Nigeria is one of the few countries in the world where such ecosystems as the mangrove and rain forests of the south, rich savannah plains in the middle, and brown sand dunes of the Sahara in north could be seen in a day. Combine these with the mountain ranges, deep valleys and hundreds of rivers, lakes and waterfalls.

Telecommunications Network Structure

We will choose as definition of communication network that one which describes it as the system that allow to systems and people to communicate to each other, independently where they are located.



Transport Networks

It contains the traffic system and the interconnection between the different elements of the network. It can be shared for different types of services, voice or data. With commutation systems they are the veins and heart of the networks.

X.25, The Packet Switching Network

X.25 is an ITU-T standard protocol suite for WAN, Wide Area Networks. It defines standard physical layer, data link layer and network layers (layers 1 through 3) of the OSI model. The packet switching network was the common name given to the international collection of X.25 providers, typically the various national telephone companies. Their combined network had large global coverage during the 1980s and into the '90s, and it is still in use mainly in transaction systems.

The X.25 model was based on the concept of establishing "virtual calls" through the network, with "data terminating equipment" (DTE's) providing endpoints to users that looked like point-to-point connections.

X.25 was developed in the era of dumb terminals connecting to host computers. Instead of dialing directly “into” the host computer — which would require the host to have its own pool of modems and phone lines, and require non-local callers to make long-distance calls — the host could have an X.25 connection to a network service provider. Now dumb-terminal users could dial into the network's local “PAD” (Packet Assembly/Disassembly facility), a gateway device connecting modems and serial lines to the X.25 link as defined by the ITU-T X.29 and X.3 standards.

With the widespread introduction of "perfect" quality digital phone services and error correction in modems, the overhead of X.25 was no longer worthwhile. The result was Frame Relay, essentially the X.25 protocol with the error correction systems removed, and somewhat better throughput as a result. The concept of virtual circuits is still used within ATM to allow for traffic engineering and network multiplexing.

ATM. Asynchronous Transfer Mode.

Asynchronous Transfer Mode, or ATM for short, is a cell relay network protocol which encodes data traffic into small fixed-sized (53 byte; 48 bytes of data and 5 bytes of header information) cells instead of variable sized *packets* as in packet-switched networks (such as the Internet Protocol or Ethernet). It is a connection-oriented technology, in which a connection is established between the two endpoints before the actual data exchange begins.

ATM was intended to provide a single unified networking standard that could support both synchronous channel networking (PDH, SDH) and packet-based networking (IP, Frame relay, etc), whilst supporting multiple levels of quality of service for packet traffic.

ATM provides a highly complex technology, with features intended for applications ranging from global telco networks to private local area computer networks. ATM has been a partial success as a technology, with widespread deployment, but generally only used as a transport for IP traffic; its goal of providing a single integrated technology for LANs, public networks, and user services has largely failed.

Numerous [telcos](#) have implemented wide-area ATM networks, and many ADSL implementations use ATM. However, ATM has failed to gain wide use as a LAN technology, and its great complexity has held back its full deployment as the single integrating network technology in the way that its inventors originally intended.

Currently it seems like Ethernet implementations (10Gbit-Ethernet, [MetroEthernet](#)) will replace ATM in many locations. Enables convergence of Voice, Video, Data on one network

FR. Frame Relay

Frame relay began as a stripped-down version of the X.25 protocol, releasing itself from the error-correcting burden most commonly associated with X.25. When frame relay detects an error, it simply drops the offending packet.

In the context of computer networking, frame relay consists of an efficient data transmission technique used to send digital information quickly and cheaply in a relay of frames to one or many destinations from one or many end-points. Network providers commonly implement frame relay for voice and data as an encapsulation technique, used *between* local area networks (LANs) *over* a wide area network (WAN). Each end-user gets a private line (or leased line) to a frame-relay node. The frame-relay network handles the transmission over a frequently-changing path transparent to all end-users.

The designers of frame relay aimed at a telecommunication service for cost-efficient data transmission for intermittent traffic between local area networks (LANs) and between end-points in a wide area network (WAN). Frame relay puts data in variable-size units called "frames" and leaves any necessary error-correction (such as re-transmission of data) up to the end-points. This speeds up overall data transmission. For most services, the network provides a permanent virtual circuit (PVC), which means that the customer sees a continuous, dedicated connection without having to pay for a full-time leased line, while the service-provider figures out the route each frame travels to its destination and can charge based on usage.

Frame relay relays packets at the data link layer (layer 2) of the Open Systems Interconnection (OSI) model rather than at the network layer (layer 3). A frame can incorporate packets from different protocols such as Ethernet and X.25. It varies in size up to a thousand bytes or more.

Frame Relay was originally developed as an extension of Integrated Services Digital Network (ISDN). It was designed to enable the circuit-switched technology to be transported on a packet-switched network. The technology has become a stand-alone and cost-effective means of creating a WAN.

Frame Relay has become one of the most extensively used WAN protocols. One reason for its popularity is that it is inexpensive compared to leased lines. Another reason Frame Relay is popular is that configuration of user equipment in a Frame Relay network is very simple.

ISDN. Integrated Services Digital Network

Integrated Services Digital Network (ISDN) is a type of circuit switched telephone network system, designed to allow digital transmission of voice and data over ordinary telephone copper wires, resulting in better quality and higher speeds than available with analog systems. More broadly, ISDN is a set of protocols for establishing and breaking circuit switched connections, and for advanced call features for the user.

In a videoconference, ISDN provides simultaneous voice, video, and text transmission between individual desktop videoconferencing systems and group videoconferencing systems

In ISDN, there are two types of channels, *B* (for "Bearer") and *D* (for "Delta"). *B channels* are used for data (which may include voice), and *D channels* are intended for signalling and control (but can also be used for data).

There are two kinds of access to ISDN. Basic rate interface (BRI) — also Basic rate access (BRA) — consists of two B channels, each with bandwidth of 64 kbit/s, and one D channel with a bandwidth of 16 kbit/s. Together these three channels can be designated as 2B+D. Primary rate interface (PRI) — also Primary rate access (PRA) — contains a greater number of B channels and a D channel with a bandwidth of 64 kbit/s.

Using a variation of the alternate mark inversion encoding technique, call data is transmitted over the data (B) channels, with the signalling (D) channels used for call setup and management. Once a call is set up, there is a simple 64 kbit/s synchronous bidirectional data channel between the end parties, lasting until the call is terminated.

There can be as many calls as there are data channels, to the same or different end-points.

The D channel can also be used for sending and receiving X.25 data packets, and connection to X.25 packet network.

TCP/IP. Transmission Control Protocol / Internet Protocol

TCP/IP suite of protocols is the set of protocols used to communicate across the internet. Since its development in the US Department of Defense Advanced Research Project Agency (DARPA), It has been widely used on many organizational networks due to its flexibility and wide array of functionality provided. Even some companies, as Microsoft, who had originally developed their own set of protocols, now is more widely using TCP/IP, at first for transport and now to support other services. It is used in Wide Area Networks as well as Local area Networks, with only a few exceptions. It could be said that TCP/IP is the platform over which Internet runs.

Firstly, we will take an overview on TCP/IP pile, comparing it with the OSI reference model, to continue with a deeper description of IP and TCP protocol, in the internet and transport layer each one.

OSI	TCP/IP
Application (X.400, FTAM, VT)	Applications SMTP, TELNET, FTP
Presentation	
Session	
Transport	Transport (Transmission Control Protocol)
Network	Internet (Internet Protocol)
Data Link	Network Interface
Physical	Hardware

X.400 - Message Handling Systems

FTAM - File Transfer and Access Management

VT - Virtual Terminal

TELNET - Remote login protocol

SMTP - Simple Mail Transfer Protocol

FTP - File Transfer Protocol

Applications Layer: This layer is broadly equivalent to the application, presentation and session layers of the OSI model. It gives an application access to the communication environment. Examples of protocols found at this layer are Telnet, FTP (File Transfer Protocol), SNMP (Simple Network Management Protocol), HTTP (Hyper Text Transfer Protocol) and SMTP (Simple Mail Transfer Protocol).

Transport Layer: The transport layer is similar to the OSI transport model, but with elements of the OSI session layer functionality. This layer provides an application layer delivery service. The two protocols found at the transport layer are TCP (Transmission Control Protocol) and UDP (User Datagram Protocol). Either of these two protocols are used by the application layer process, the choice depends on the application's transmission reliability requirements.

TCP is a reliable, connection-oriented protocol that provides error checking and flow control through a virtual link that it establishes and finally terminates. This gives a reliable service, therefore TCP would be utilised by FTP and SNMP - file transfer and email delivery have to be accurate and error free.

UDP is an unreliable, connectionless protocol that provides data transport with lower network traffic overheads than TCP - UDP does not error check or offer any flow control,

this is left to the application process. SNMP uses UDP - SNMP is used to monitor network performance, so its operation must not contribute to congestion.

Internet Layer: This layer is responsible for the routing and delivery of data across networks. It allows communication across networks of the same and different types and carries out translations to deal with dissimilar data addressing schemes. IP (Internet Protocol) and ARP (Address Resolution Protocol) are both to be found at the Internet layer.

Network Interface and Hardware Layers: The combination of datalink and physical layers deals with pure hardware (wires, satellite links, network interface cards, etc.) and access methods such as CSMA/CD (carrier sensed multiple access with collision detection). Ethernet exists at the network access layer - its hardware operates at the physical layer and its medium access control method (CSMA/CD) operates at the datalink layer.

Let's see now a little more about the two protocols that give name to this suite of protocols.

Internet Protocol (IP)

The Internet Protocol is a network-layer protocol that contains addressing information and some control information that enables packets to be routed. IP is documented in RFC 791 and is the primary network-layer protocol in the Internet protocol suite. IP has two primary responsibilities: providing connectionless, and providing fragmentation and reassembly of datagrams to support data links with different maximum-transmission unit sizes.

As with any other network-layer protocol, the IP addressing scheme is integral to the process of routing IP datagrams through an internetwork. Each host on a TCP/IP network is assigned a unique 32-bit logical address that is divided into two main parts: the network number and the host number. The network number identifies a network and must be assigned by the Internet Network Information Center (InterNIC) if the network is to be part of the Internet. An Internet Service Provider (ISP) can obtain blocks of network addresses from the InterNIC and can itself assign address space as necessary. The host number identifies a host on a network and is assigned by the local network administrator.

IP addressing supports five different address classes: A, B, C, D, and E. Only classes A, B, and C are available for commercial use.

Transmission Control Protocol (TCP)

The TCP provides reliable transmission of data in an IP environment. TCP corresponds to the transport layer of the OSI reference model. Among the services TCP provides are stream data transfer, reliability, efficient flow control, full duplex operation, and multiplexing.

With stream data transfer, TCP delivers an unstructured stream of bytes identified by sequence numbers. This service benefits applications because they do not have to piece

data into blocks before handing it off to TCP. Instead, TCP groups bytes into segments and passes them to IP for delivery.

TCP offers reliability by providing connection-oriented, end-to-end reliable packet delivery through a network. It does this by sequencing bytes with a forwarding acknowledgment number that indicates to the destination the next byte the source expects to receive. Bytes not acknowledged within a specified time period are retransmitted. The reliability mechanism of TCP allows devices to deal with lost, delayed, duplicate, or misread packets. A time-out mechanism allows devices to detect lost packets and request retransmission.

TCP offers efficient flow control, which means that, when sending acknowledgments back to the source, the receiving TCP process indicates the highest sequence number it can receive without overflowing its internal buffers.

Full-duplex operation means that TCP processes can both send and receive at the same time.

Finally, TCP's multiplexing means that numerous simultaneous upper-layer conversations can be multiplexed over a single connection.

Access Networks

The access network is the network that connects subscribers to telecommunication service providers over public ground. It can be considered the route between the subscriber's home, and the ISP (Internet Service Provider) itself.

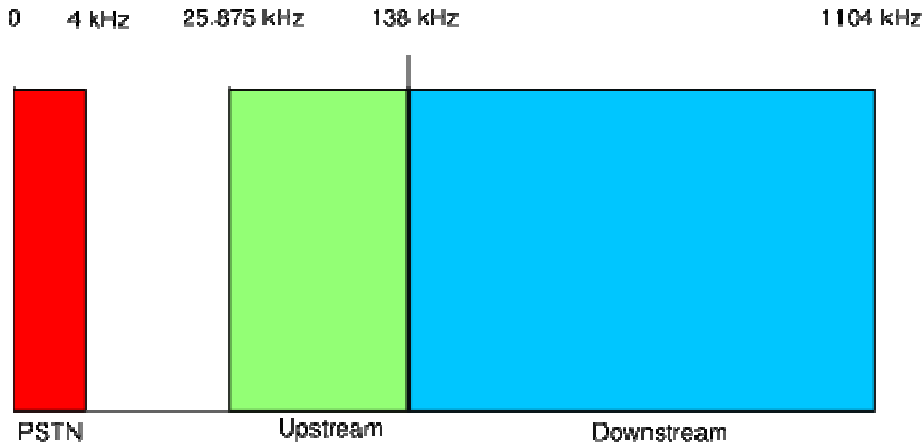
ADSL. Asymmetric Digital Subscriber Line

Asymmetric Digital Subscriber Line (ADSL) is a form of DSL, a data communications technology that enables faster data transmission over copper telephone lines than a conventional modem can provide.

The distinguishing characteristic of ADSL over [xDSL](#) is that the volume of data flow is greater in one direction than the other, i.e. it is asymmetric. Providers usually market ADSL as a service for people to connect to the Internet in a relatively passive mode: able to use the higher speed direction for the "download" from the Internet but not needing to run servers that would require bandwidth in the other direction.

There are both technical and marketing reasons why ADSL is in many places the most common type offered to home users. On the technical side, there is likely to be more crosstalk from other circuits at the DSLAM end (where the wires from many local loops are close together) than at the customer premises. Thus the upload signal is weakest at the noisiest part of the local loop, while the download signal is strongest at the noisiest part of the local loop. It therefore makes technical sense to have the DSLAM transmit at a higher bit rate than does the modem on the customer end. Since the typical home user in fact does prefer a higher download speed, the telephone companies chose to make a virtue out of necessity, hence ADSL.

For conventional ADSL, downstream rates start at 256 [kbit/s](#) and typically reach 8 [Mbit/s](#) within 1.5 km (5000 ft) of the DSLAM equipped central office or remote terminal. Upstream rates start at 64 kbit/s and typically reach 256 kbit/s but can go as high as 1024 kbit/s. The name ADSL Lite is sometimes used for the slower versions.



Note that distances are only approximations aimed at consumers of ADSL services. Signal attenuation and Signal to Noise Ratio are defining characteristics, and can vary completely independently of distance (e.g., non-copper cabling, cable diameter). Real world performance is also dependent to the line impedance, which can change dynamically either dependent on weather conditions (very common for old overhead lines) or on the number and quality of joints or junctions in a particular cable length.

A newer variant called ADSL2 provides higher downstream rates of up to 12 Mbit/s for spans of less than 2.5 km (8000 ft). Higher symbol rates and more advanced noise shaping are responsible for these increased speeds. ADSL2+, also referred to as ITU G.992.5, boosts these rates to up to 24 Mbit/s for spans of less than 1.5 km (5000 feet). ADSL2+ also offers seamless bonding options, allowing lines with higher attenuation or lower signal to noise (SNR) ratios to be bonded together to achieve theoretically the sum total of the number of lines (i.e., up to 50 Mbit/s for two lines, etc.), as well as options in power management and seamless rate adaptation - changing the data rate used without requiring to resynchronize.

ADSL service providers may offer either static or dynamic IP addressing. Static addressing is preferable for people who may wish to connect to their office via a virtual private network, for some Internet gaming, and for those wishing to use ADSL to host a Web server.

PLC. Power Line Communications

Power line communication (PLC), also called Mains Communication or Power Line Telecoms (PLT), is a wireline technology that is able to use the current electricity networks for data and voice transmission. It includes Broadband over Power Lines (BPL) with data rates sometimes above 1 Mbit/s and Narrowband over Power Lines with much lower data rates. The carrier can communicate voice and data by superimposing an analog signal over the standard 50 or 60 Hz alternating current (AC). Traditionally

electrical utilities used low-speed power-line carrier circuits for control of substations, voice communication, and protection of high-voltage transmission lines.

PLC is an alternative solution from a social point of view for those countries or regions with a lack of telecommunications infrastructure, but they have electrical infrastructure. In this respect, the example of China can turn out to be ideal today, since its teledensidad is still low and its structure of electrical net is very adapted for the PLC solutions, though the rates of growth that experiments at present, in fix telephony as well as in mobile one, could make this social application of the PLC unnecessary to very short term in China.

Broadband over Power Lines (BPL) is the use of PLC technology to provide broadband Internet access through ordinary power lines. A computer (or any other device) would need only to plug a BPL "modem" into any outlet in an equipped building to have high-speed Internet access.

BPL offers obvious benefits over regular cable or DSL connections: the extensive infrastructure already available would appear to allow more people in more locations to have access to the Internet. Also, such ubiquitous availability would make it much easier for other electronics, such as televisions or sound systems, to hook up. However, variations in the physical characteristics of the electricity network and the current lack of IEEE standards mean that provisioning of the service is far from being a standard, repeatable process and the amount of bandwidth a BPL system can provide compared to cable and wireless is in question.

High-speed data transmission, or Broadband over Power Line uses the electric circuit between the electric substations and home networks. A standard used for this is *ETSI PLT*.

PLC modems transmit in medium and high frequency (1.6 to 30 MHz electric carrier). The asymmetric speed in the modem is generally from 256 [kbit/s](#) to 2.7 Mbit/s. In the repeater situated in the meter room the speed is up to 45 Mbit/s and can be connected to 256 PLC modems. In the medium voltage stations, the speed from the head ends to the Internet is up to 135 Mbit/s. To connect to the Internet, utilities can use optical fiber backbone or wireless link.

Much higher speed transmissions using microwave frequencies transmitted via a newly discovered surface wave propagation mechanism have been demonstrated using only a single power line conductor. These systems have shown the potential for symmetric and full duplex communication in excess of 1 Gbit/s in each direction. Multiple WiFi channels as well as simultaneous analog television in the 2.4 and 5.3 GHz unlicensed bands have been demonstrated operating over medium voltage lines.

Wifi, Wireless Fidelity

Wi-Fi is an acronym for Wireless Fidelity. It is a set of product compatibility standards for wireless local area networks (WLAN) based on the IEEE 802.11 specifications. New

standards beyond the 802.11 specifications, such as 802.16([WiMAX](#)), are currently in the works and offer many enhancements, anywhere from longer range to greater transfer speeds.

Wi-Fi was intended to be used for mobile devices and LANs, but is now often used for Internet access. It enables a person with a wireless-enabled computer or personal digital assistant (PDA) to connect to the Internet when in proximity of an access point. The geographical region covered by one or several access points is called a hotspot.

Contrary to popular belief, Wi-Fi did not originally stand for *Wireless-Fidelity*. The term "Wi-Fi" was developed by the Wi-Fi Alliance along with the Interbrand Corporation to describe WLAN products that are based on the IEEE 802.11 standards. Later, the term "Wireless Fidelity" was coined with the marketing of a new tag line, "The Standard for Wireless Fidelity." But that was soon dropped due to confusion among customers and consumers.

Free Wi-Fi: While commercial services attempt to move existing business models to Wi-Fi, many groups, communities, cities, and individuals have set up free Wi-Fi networks, often adopting a common peering agreement in order that networks can openly share with each other. Free wireless mesh networks are often considered the future of the internet.

Many municipalities have joined with local community groups to help expand free Wi-Fi networks. Some community groups have built their Wi-Fi networks entirely based on volunteer efforts and donations.

Some smaller countries and municipalities already provide free Wi-Fi hotspots and residential Wi-Fi internet access to everyone. Examples include the Kingdom of Tonga or Estonia which have already a large number of free Wi-Fi hotspots throughout their countries.

In Paris France, [OzoneParis](#) offers free Internet access for life to anybody who contributes to the Pervasive Network's development by making their rooftop available for the WiFi Network.

However, there is also a third subcategory of networks set up by certain communities such as universities where the service is provided free to members and guests of the community such as students, yet used to make money by letting the service out to companies and individuals outside. An example of such a service is [Sparknet](#) in Finland. Sparknet also supports [OpenSparknet](#), a project where people can name their own wireless access point as a part of Sparknet in return for certain benefits.

Recently commercial Wi-Fi providers have built free Wi-Fi hotspots and hotzones. These providers hope that free Wi-Fi access would equate to more users and significant return on investment.

LMDS. Local Multipoint Distribution Service

Local Multipoint Distribution Service is a broadband wireless access technology that uses microwave signals operating between the 26GHz and 29GHz bands. In the United States, frequencies from 31.0 through 31.3 GHz are also considered LMDS frequencies.

LMDS is a point-to-multipoint service, hence is typically deployed for access by multiple parties. Throughput capacity and distance of the link depends on the modulation method used - either phase-shift keying or amplitude modulation. Links up to 5 miles (8 km) from the base station are possible, but distance is typically limited to 1.5 miles by rain fade because heavy rain can severely attenuate signal levels.

Point-to-point systems are also capable of using the LMDS frequencies and can reach slightly farther distances due to increased antenna gain.

Following we will see two telecommunications technologies that, although they cannot be classified exactly nor between access networks neither by transport one, their application could replace these two categories. They can be a good solution to evaluate in areas without a network infrastructure.

VSAT. Very small aperture terminal

A VSAT, for Very Small Aperture Terminal is a 2-way satellite ground station with a dish antenna that is smaller than 3 meters, as compared to around 10 meters for other types of satellite dishes.

VSAT is most commonly used for point of sale transactions including credit cards and RFID applications such as Mobil [Speedpass](#). There are over 100,000 gas stations in the United States alone that use VSAT. It is also used by local car dealerships affiliated with manufacturers such as Ford and General Motors, for transmitting and receiving sales figures & orders, as well as for receiving internal communications, parts ordering, service bulletins, and interactive distance learning training courses from the manufacturer. The FordStar network, used by Ford and its local dealers, is an example of this.

Most VSAT networks are usually configured in one of these topologies:

A star topology, using a central uplink site, such as a network operations center (NOC), to transport data back and forth to each VSAT terminal via satellite.

A mesh topology, where each VSAT terminal relays data via satellite to another terminal by acting as a hub, minimizing the need for a centralized uplink site.

A combination of both star and mesh topologies. Some VSAT networks are configured by having several centralized uplink sites (and VSAT terminals stemming from it) connected in a multi-star topology with each star (and each terminal in each star) connected to each other in a mesh topology. Others configured in only a single star topology sometimes will have each terminal connected to each other as well, resulting in each terminal acting as a central hub. These configurations are utilized to minimize the overall cost of the network, and to alleviate the amount of data that has to be relayed through a central uplink site (or sites) of a star or multi-star network.

Star topology services like Direcway and others can be used to provide broadband wide area networks, as well as to provide broadband internet access. Applications of this include intranet networking for front and back office applications, managed store and forward solutions such as digital signage, and interactive distance learning.

WiMAX. Worldwide Interoperability for Microwave Access

WiMAX is an acronym that stands for Worldwide Interoperability for Microwave Access, a certification mark for products that pass conformity and interoperability tests for the IEEE 802.16 standards. WiMAX is a standards-based wireless technology that provides high-throughput broadband connections over long distances. WiMAX can be used for a number of applications, including "last mile" broadband connections, hotspots and cellular backhaul, and high-speed enterprise connectivity for business.

WiMAX is a wireless metropolitan area network (MAN) technology that can connect IEEE 802.11 (Wi-Fi) hotspots with each other and to other parts of the Internet and provide a wireless alternative to cable and DSL for last mile (last km) broadband access. IEEE 802.16 provides up to 50 km (31 miles) of linear service area range and allows connectivity between users without a direct line of sight. Note that this should not be taken to mean that users 50 km (31 miles) away without line of sight will have connectivity. Practical limits from real world tests seem to be around "3 to 5 miles" (5 to 8 kilometers). The technology has been claimed to provide shared data rates up to 70 Mbit/s, which, according to WiMAX proponents, is enough bandwidth to simultaneously support more than 60 businesses with T1-type connectivity and well over a thousand homes at 1Mbit/s DSL-level connectivity. Real world tests, however, show practical maximum data rates between 500kbit/s and 2 Mbit/s, depending on conditions at a given site.

A recent addition to the WiMAX standard is underway which will add full mesh networking capability by enabling WiMAX nodes to simultaneously operate in "subscriber station" and "base station" mode. This will blur that initial distinction and allow for widespread adoption of WiMAX based mesh networks and promises widespread WiMAX adoption.

It is also anticipated that WiMAX will allow interpenetration for broadband service provision of [VoIP](#), video, and Internet access—simultaneously. Most cable and traditional telephone companies are closely examining or actively trial-testing the potential of WiMAX for "last mile" connectivity. This should result in better pricepoints for both home and business customers as competition results from the elimination of the "captive" customer bases both telephone and cable networks traditionally enjoyed. Even in areas without preexisting physical cable or telephone networks, WiMAX could allow access between anyone within range of each other. Home units the size of a paperback book that provide both phone and network connection points are already available and easy to install.

There is also interesting potential for interoperability of WiMAX with legacy cellular networks. WiMAX antennas can "share" a cell tower without compromising the function of cellular arrays already in place. Companies that already lease cell sites in widespread service areas have a unique opportunity to diversify, and often already have the necessary spectrum available to them. WiMAX antennae may be even connected to an Internet backbone via either a light fiber optics cable or a directional microwave link.

Some cellular companies are evaluating WiMAX as a means of increasing bandwidth for a variety of data-intensive applications. In line with these possible applications is the technology's ability to serve as a very high bandwidth "backhaul" for Internet or cellular phone traffic from remote areas back to a backbone. Although the cost-effectiveness of WiMAX in a remote application will be higher, it is definitely not limited to such applications, and may in fact be an answer to expensive urban deployments of T1 backhauls as well.

Given developing countries' (such as in Africa) limited wired infrastructure, the costs to install a WiMAX station in conjunction with an existing cellular tower or even as a solitary hub will be diminutive in comparison to developing a wired solution. The wide, flat expanses and low population density of such an area lends itself well to WiMAX and its current diametrical range of 30 miles. For countries that have skipped wired infrastructure as a result of inhibitive costs and unsympathetic geography, WiMAX can enhance wireless infrastructure in an inexpensive, decentralized, deployment-friendly and effective manner.

Mobile Telecommunications Network

The service of mobile telephony is conceived as an extension of the telephonic basic service, making the communication possible between terminals that are not associated with a physical certain place.

Nowadays, the mobile telephony service is offered on two different technologies, analogical and digital, which support the services of vocal communication, information and short messages.

In analogical telephony the voice is transported as a constant sign without codifying, whereas in the mobile digital telephony the voice is digitized and break into packages that can share the same channel of frequencies with other packages proceeding from other conversations, what allows to increase the capacity of the system, taking advantage to the maximum of a scanty resource as it is the radioelectric spectrum.

GSM. Global System for Mobile Communications

The Global System for Mobile Communications (GSM) is the most popular standard for mobile phones in the world. GSM service is used by over 1.5 billion people across more than 210 countries and territories. The ubiquity of the GSM standard makes international roaming very common between mobile phone operators, enabling subscribers to use their phones in many parts of the world. GSM differs significantly from its predecessors in that both signaling and speech channels are digital, which means that it is considered a *second generation* (2G) mobile phone system. This fact has also meant that data communication

was built into the system from very early on. GSM is an open standard which is currently developed by the 3GPP.

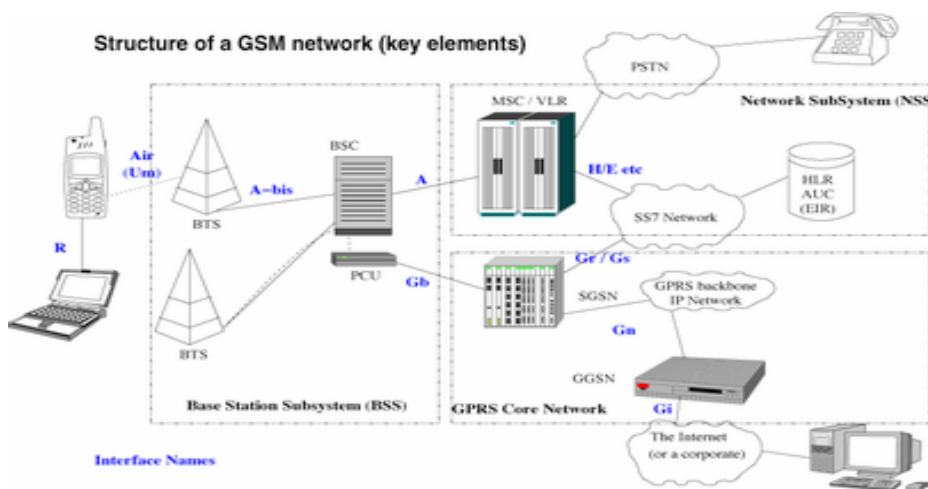
From the point of view of the consumer, the key advantage of GSM systems has been higher digital voice quality and low cost alternatives to making calls such as text messaging. The advantage for network operators has been the ability to deploy equipment from different vendors because the open standard allows easy inter-operability. Also, the standards have allowed network operators to offer roaming services which mean subscribers can use their phone all over the world.

GSM is a cellular network, which means that mobile phones connect to it by searching for cells in the immediate vicinity. GSM networks operate at various different radio frequencies. Most GSM networks operate at 900 MHz or 1800 MHz. The exception to the rule are networks in parts of the Americas (including the USA and Canada) that operate at 850 MHz or 1900 MHz.

Cell radius varies depending on antenna height, antenna gain and propagation conditions from a couple of hundred meters to several tens of kilometers. The longest distance the GSM specification supports in practical use is 35 km. There is also a concept of an extended cell, where the cell radius could be double or even more.

Indoor coverage is also supported by GSM and is achieved by using power splitters to deliver the radio signal from the antenna outdoors to a separate indoor antenna distribution system. This is typically deployed when a lot of call capacity is needed indoors, for example in shopping centers or airports. However, this is not a pre-requisite, since indoor coverage is also provided by in-building penetration of the radio signal.

The structure of a GSM network is as follows;



The network behind the GSM system seen by the customer is large and complicated in order to provide all of the services which are required. It is divided into a number of sections and these are each covered in separate articles.

-the Base Station Subsystem (the base stations and their controllers).

- the Network and Switching Subsystem (the part of the network most similar to a fixed network). This is sometimes also just called the core network.
- the GPRS Core Network (the optional part which allows packet based Internet connections).
- all of the elements in the system combine to produce many GSM services such as voice calls and SMS.

GPRS. General Packet Radio Service

General Packet Radio Service (GPRS) is a mobile data service available to users of GSM mobile phones. It is often described as "2.5G", that is, a technology between the second (2G) and third (3G) generations of mobile telephony. It provides moderate speed data transfer, by using unused channels in the GSM network. Originally there was some thought to extend GPRS to cover other standards, but instead those networks are being converted to use the GSM standard, so that is the only kind of network where GPRS is in use.

GPRS is different from the older Circuit Switched Data (or CSD) connection included in GSM standards releases before release 97. In CSD, a data connection establishes a circuit, and reserves the full bandwidth of that circuit during the lifetime of the connection. GPRS is packet-switched which means that multiple users share the same transmission channel, only transmitting when they have data to send. This means that the total available bandwidth can be immediately dedicated to those users who are actually sending at any given moment, providing higher utilisation where users only send or receive data intermittently. Web browsing, receiving e-mails as they arrive and instant messaging are examples of uses that require intermittent data transfers, which benefit from sharing the available bandwidth.

Usually, GPRS data are billed per kilobytes of information transceived while circuit-switched data connections are billed per second. The latter is to reflect the fact that even during times when no data are being transferred, the bandwidth is unavailable to other potential users.

GPRS originally supported IP, PPP and X.25 connections. The latter has been typically used for applications like wireless payment terminals although it has been removed as a requirement from the standard. X.25 can still be supported over PPP, or even over IP, but doing this requires either a router to do encapsulation or intelligence built into the end terminal.

UMTS. Universal Mobile Telecommunications System

Universal Mobile Telecommunications System (UMTS) is one of the third-generation (3G) mobile phone technologies. It uses W-CDMA as the underlying standard, is standardized by the 3GPP, and represents the European/Japanese answer to the ITU IMT-2000 requirements for 3G Cellular radio systems.

To differentiate UMTS from competing network technologies, UMTS is sometimes marketed as 3GSM, emphasizing the combination of the 3G nature of the technology and the GSM standard which it was designed to succeed.

UMTS supports up to 1920 kbit/s data transfer rates (and not 2 [Mbit/s](#) as frequently seen), although at the moment users in the real networks can expect performance up to 384 kbit/s - in Japan upgrades to 3 Mbit/s are in preparation. However, this is still much greater than the 14.4 kbit/s of a single GSM error-corrected circuit switched data channel or multiple 14.4 kbit/s channels in HSCSD, and - in competition to other network technologies such as CDMA-2000, PHS or wLAN - offers access to the World Wide Web and other data services on mobile devices.

Precursors to 3G are 2G mobile telephony systems, such as GSM, CDMA, PDC, PHS and other 2G technologies deployed in different countries. In the case of GSM, there is an evolution path from 2G, called GPRS, also known as 2.5G. GPRS supports a much better data rate (up to a theoretical maximum of 140.8kbit/s, though typical rates are closer to 56kbit/s) and is packet switched rather than connection oriented (circuit switched). It is deployed in many places where GSM is used.

In 2006, UMTS networks in Japan will be upgraded with High Speed Downlink Packet Access (HSDPA), sometimes known as 3.5G. This will make a downlink transfer speed of up to 14.4 Mbit/s possible. Work is also progressing on improving the uplink transfer speed with the High-Speed Uplink Packet Access (HSUPA)

In 2006, [Vodacom](#) in South Africa is also working towards implementing High Speed Downlink Packet Access (HSDPA).

In Austria, Mobilkom Austria already implemented and deployed HSDPA for public usage.

Marketing material for UMTS has emphasised the possibility of mobile videoconferencing, although experience in Japan and elsewhere has shown that user demand for Video calls is not very high.

The first UMTS network in Africa was launched on the island of Mauritius in November 2004, followed by Vodacom's launch of 3G services in South Africa in December 2004.

Operators are starting to sell mobile internet products that combine 3G and [Wi-Fi](#) in one service. Laptop owners are sold a UMTS modem and given a client program that detects the presence of a Wi-Fi network and switches between 3G and Wi-Fi when available. Initially Wi-Fi was seen as a competitor to 3G, but it is now recognised that as long as the operator owns or leases the Wi-Fi network, they will be able to offer a more competitive product than with UMTS only. Nokia has forecasted that UMTS devices will make one sixth of all cellular phones by the end of 2006.

Some Data about Telecommunications in Nigeria

Following we are going to study some relevant data about telecommunications uses in Nigeria what will give us an idea about the actual development situation.

Telephones - mobile cellular: Recent deregulation of the mobile phone market has led to the introduction of GSM mobile network providers operating on the 900/1800 MHz spectrum, MTN Nigeria, V-Mobile, Globacom and MTel. Use of cell-phones have soared, and have mostly replaced the unreliable Nitel operated ground phones. The current estimate lies at about 19,000,000 mobile phones (December 2005).

Telephone system: an inadequate system, further limited by poor maintenance; major expansion is required and a start has been made. New cellular phone introduction has fixed the communication problem to a large part. It is about 900.000 main lines in use.

Internet Service Providers (ISPs): 12. There is satellite access to European Satellite internet providers all over the countries. In most towns in Nigeria, there are 5 or more public internet Cafes, privately owned and operated, and often connected over European internet connections.

A new dimension to internet connectivity has been introduced with hundreds of thousands of young people now accessing the internet on their WAP-enabled mobile phones, smartphones and on their PCs using their phones as a modem. This is largely due to the introduction of GPRS (General Packet Radio Service) connectivity by the GSM operators. All four existing GSM networks presently offer GPRS services and plans are underway for the introduction of 3G/UMTS in 2006.

Internet Users: 200,000 (2005)

How can be Africa Benefited by Globalisation and Telecommunications Networks

I would like to mention here the Britain's Foreign Secretary Jack Straw declarations, what I think resume how important is this moment of new opportunities for Africa: "the globalisation could worsen Africa's plight if the continent fails to rise to its challenges. As the world economy becomes more competitive, an Africa which fails to rise to that challenge risks becoming increasingly marginalised. An uncompetitive Africa will fail to attract investment, fail to diversify away from exports of primary products, fail to compete in terms of productivity and so fail to reduce poverty. If Africa pursued the right policies and won the full support of the international community, this continent could be the success story of the 21st century".

Therefore, it is clear that the new economy environment motivated by de introduction of new technologies in production processes, could turn into a unique opportunity in decades for less develop countries to take a position in the list of first economies of the world.

Indeed, it is needed and important effort by everybody, but specially an effort by de the governments and the main companies in Africa, the public and the private sector, a great alliance to create the necessaries infrastructures that will be the platform to develop new services, and offer them to the world.

In the case of Africa, it is important to take in account the opportunities offered by the new wireless technologies, as a way to avoid the huge investments that the fix transport networks required, which are impossible investments for most of the Africans countries. It can't be omitted the scope of technologies as wimax and wifi, what in the developing countries it turns out to be an excellent alternative for a fast deployment of services, competing directly with the infrastructures based on satellites networks, which are very costly and have a high latency. The installation of Wimax base stations is simple and economic, using a hardware that will be a standard. For what it can be seen by the mobile operators as a threat, but also, is a easy way to extend its networks and approaching to this new business in where they are not now, and which presents as an opportunity.

As we can see, in Nigeria the government is working in the right way to make “the full connectivity to telecommunications networks”, what means plenty connection to the world, a reality in this country:

A new regulatory environment sufficiently flexible to take into account new technological development and international trend towards convergence.

To meet telecommunications service needs of the social, commercial and industrial sectors of the economy.

To ensure that public telecommunications facilities are accessible to all communities in the country.

To encourage domestic production of telecommunications equipment in Nigeria, and development of related software and services.

To establish and meet aggressive targets for the installation of new Fixed and Mobile Lines.

To protect the integrity defence and the security of the state and its citizens.

To encourage Nigerian telecommunications operating companies to become global leaders in the industry.

Now rest the most difficult, to do the planned a reality.

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2.3 ICT for education and development. Software opportunities

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1. Context: Information Society, digital divide and software

The promotion of Information and Communication Technologies (ICT) as a means of fostering the economic, social and cultural development of regions is a fact that is reflected by the great number of Information Society promotion programmes carried out by governments, regional public administrations and international organisations⁹⁶.

Even if the main goals of these programmes may seem similar at first sight, the different technological, political, economic and cultural circumstances of each country and the different degree of development in terms of Information Society require specific measures to be applied in each case⁹⁷. Thus, actions towards the development of the Information Society in leading countries shall be radically different from those in less developed ones, where Information Society becomes a road to prosperity through an accelerated economic development⁹⁸.

Precisely, this specificity of Information Society promotion policies also shows the so-called digital divide phenomenon, which is the difference between availability and usage of technology between the richest and most developed countries or regions and those that have less resources and a lower level of development. The digital divide increases social and economic inequalities, since ICT improve business productivity and provide new business opportunities in the most developed countries, regions or communities, while their developing partners see how their economic indicators stagnate. As a consequence, a great number of the programmes financed by international organisations seek to reduce the digital divide in order to achieve equal opportunities for the most disadvantaged regions.

The differences between the levels of economic development in different countries are also apparent in their degree of incorporation to the Information Society. Thus, the regions that are most developed economically (Western Europe, United States and East Asia) are also those where ICT are more deeply rooted and provide, generally, good access and adoption indicators⁹⁹ as regards the population. On the other hand, in developing countries, most of the population has not yet started to enjoy the advantages of the Information Society, both because of the absence of adequate access conditions and due to the low levels of adoption among population with low literacy rates.

Table 1 shows the evolution of the digital divide in selected countries. In 1995, the difference between Denmark and Chad (at present, the first and last in the world ranking) was of 108.3 points, while in 2003 it had increased to 247 points. Taking less extreme examples, Spain and Brazil were 25.4 points apart in 1995, a considerable although moderate distance. However, the 2003 data show that the divide has grown to 60.7 points, representing a 139% increase.

	1995	1996	1997	1998	1999	2000	2001	2002	2003
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⁹⁶ Some detailed examples can be found in Feijoo et al. (2006).

⁹⁷ Melody (1996).

⁹⁸ Moore (1998).

⁹⁹ Generally, the level of access is assessed in function of infrastructure, affordability, knowledge and quality criteria.

Denmark	109.7	127.6	150.7	176.9	195.1	212.7	219.6	241.2	254.9
Sweden	113.9	136.8	163.1	183.4	203.5	215.7	223.3	240.3	251.1
USA	117.1	136.9	155.5	171.4	186.9	200.9	210.6	221.7	231.8
Japan	69.5	92.6	110.5	126.3	142.8	158.3	173.1	187.3	198.9
Spain	49.4	68.4	82.3	94.3	107.7	126.2	143.1	157.5	168.0
Brazil	24.0	34.4	41.3	49.5	60.0	72.2	90.2	99.4	107.3
Mexico	26.0	31.3	38.8	48.1	59.7	75.7	87.2	93.2	98.5
India	7.0	9.5	11.9	14.4	17.6	21.8	27.2	31.0	33.7
Chad	1.4	1.6	2.1	2.9	3.7	6.4	6.3	7.4	7.9

Table 1. Evolution of the Infostates rate (selected countries). Source: UN

Similarly to what occurs between different countries, the differences existing within the borders of a single country, be they caused by differences in income, education, gender or geographic location, also reveal an internal digital divide that cannot be underestimated. Thus, there are also actions and policies oriented towards the reduction of the digital divide undertaken by national or regional governments.

Consequently, the reduction of the digital divide becomes a priority for governments and International organisations, who undertake several Information Society promotion programmes in the most disadvantaged regions.

There are basically two key factors on which actions should be taken in order to reduce the digital divide: access and adoption. First, it is necessary to facilitate access, that is, to provide connection to the appropriate ICT infrastructures. From an economic perspective, access is directly related to the supply of networks, services and applications to population, and can be achieved through the promotion of a competitive market, the deployment of broadband networks, especially in rural areas, and subsidies to low-income users. Subsequently, adoption reflects the demand of ICT infrastructures among the population.

Most of the current Information Society (IS) development programmes start with the deployment of communication infrastructures oriented towards improving access. However, the role of adoption must not be underestimated, since the promotion of ICT usage considering the social, economic and political characteristics of the persons and communities they are addressed to is essential for the development of the IS¹⁰⁰. Compared with access, the question of adoption is much more complex. The type of content and the language used, the degree of literacy or education, the cultural, community and institutional structures, are all factors that must be taken into account should the purpose be to provide a really useful access to technologies¹⁰¹.

Ultimately, most of the capabilities of customisation and adaptation of ICT to the cultural environment of citizens rely on a technology which is basic to improve adoption: software. Computer programs control ICT hardware from low-level functionalities (e.g. network signalling) to high-level graphic user interfaces (e.g. display menus in a cell

¹⁰⁰ Gómez-Barroso and Feijóo (2005)

¹⁰¹ Warschauer (2002)

phone). Eventually, software can discriminate general purpose hardware and allow different functionalities over a certain platform, reducing production costs and providing users with access to the services and applications that better meet their requirements.

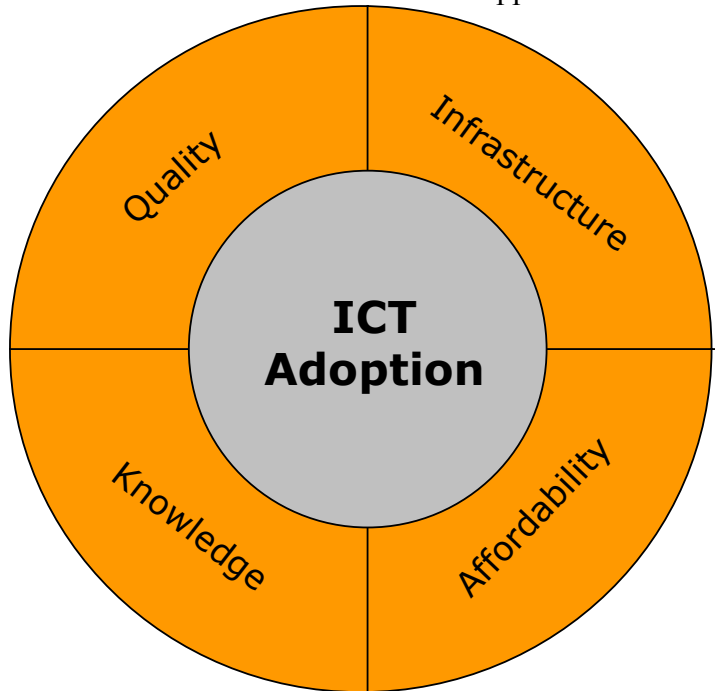


Figure 1. Actions focused on the adoption of ICT. Source: ITU (2003)

Additionally, software provides some particular characteristics which make it perfect for local and regional development since, in addition to the aforementioned customisation capabilities, it is a sector with lower entry barriers than those of other ICT and its production requires knowledge that is relatively easy to acquire. Moreover, and despite the great success of the software industry, there are still many software innovations to be developed: cultural adaptation, environmental interaction, ubiquity, artificial intelligence or system integration, just to name a few.

This chapter will show how opportunities provided by software as the driver of development are numerous both in the field of education (literacy campaigns, improvement of educational material...) and in that of economic development (outsourcing of software production from countries with greater labour costs, creation of local industry...), provided the implication of citizens is sought after in order for them to receive the greatest benefits from the Information Society.

2. The growing importance of software

In the last few years, the software industry has experienced a spectacular development which has led 5 software/informatics companies to be among the 50 major companies worldwide by stock capitalisation. Moreover, if we consider companies in software-intensive industries such as telecommunications, automotive, consumer electronics, media or device manufacturers, we can easily find 10 more companies among the top 50 (excluding banking and pharmaceutical, which might well be considered as software-intensive). However, any of the leading multinational firms makes a strong use of

standard software applications like word processors, spreadsheets, databases, e-mail clients and web browsers, and many of them have incorporated Enterprise Resource Planning (ERP) software, hence the importance of software for modern corporations.

Company	Country	URL
Softtek	Mexico	http://www.softtek.com
Politec	Brazil	http://www.politec.com
Neusoft Group Ltd.	China	http://www.neusoft.com/en
BroadenGate Systems Inc.	China	http://www.broadengate.com
Freeborders	China	http://www.freeborders.com
Luxoft	Russia	http://www.luxoft.com
EPAM Systems, Inc.	Russia	http://www.epam.com
Ness Technologies Inc.	Israel	http://www.ness.com
ASCI S.A. de C.V.	Mexico	http://www.asci.us
Neoris	Mexico	http://www.neoris.com
DataArt	Russia	http://www.dataart.com
ITCI ¹⁰²	Russia	http://www.itci.com
Venus Software Corporation	China	http://www.vsc.com
DBAccess	Venezuela	http://www.dbaccess.com

Table 2. Emerging Outsourcing Players (software development, consulting, IT services...) Source: BusinessWeek (January 30, 2006) with data from Gartner Inc.

While a strong industry has been created in these years, electronic communications have also allowed the spreading of software phenomena based on collaborative work such as the so-called Free / Open Source Software (F/OSS), the model of which is supported on the freedoms awarded to whoever is willing to study, modify or redistribute the source code, so as to adapt it with ease to the requirements, preferences and cultural specificities of its addressees. Although F/OSS is not widely spread, it is very popular in some academic circles and it is considered to be a serious alternative to proprietary models in developing countries.

Ranking	Company	Capitalisation 2005 (bn\$)	Country
3	Microsoft	294.65	USA
13	Intel	160.83	USA
21	IBM	140.42	USA
28	Cisco Systems	107.94	USA
44	Hewlett – Packard	85.09	USA

Table 3. Companies in the software/informatics business among the 50 major companies by stock capitalisation. Source: BusinessWeek global 1200 (2005).

Ranking	Company	Capitalisation 2005 (bn\$)	Country
1	General Electric	377.42	USA

¹⁰² IT Consulting International was acquired by Luxoft (also in this ranking) on April 17, 2006.

14	Toyota Motor	158.20	Japan
18	Vodafone Group	147.64	UK
32	Samsung electronics	100.38	Korea
35	AT&T	97.34	USA
36	China Mobile	96.77	Hong Kong
41	Verizon Communications	88.42	USA
45	Time Warner	84.10	USA
48	Nokia	76.71	Finland
50	Telefónica	76.33	Spain

Table 4. Software-intensive companies (excluding software/informatics industry) among the 50 major companies by stock capitalisation. Source: BusinessWeek global 1200 (2005).

A quick look at the ICT market today clearly reveals a new trend towards mobility and ubiquity that might have started in the mid 1990s with the boom of cellular telephony and its rapid spread worldwide¹⁰³. Anyhow, it is now that an increasing number of users can afford all sort of portable devices with technologies that allow them to be connected to others or to the Internet in any place and in any circumstance (e.g. Bluetooth, WiFi, GSM...). Once again, the underlying technology for all those standards is no other than software, and this shows how important computer programs are becoming in our lives.

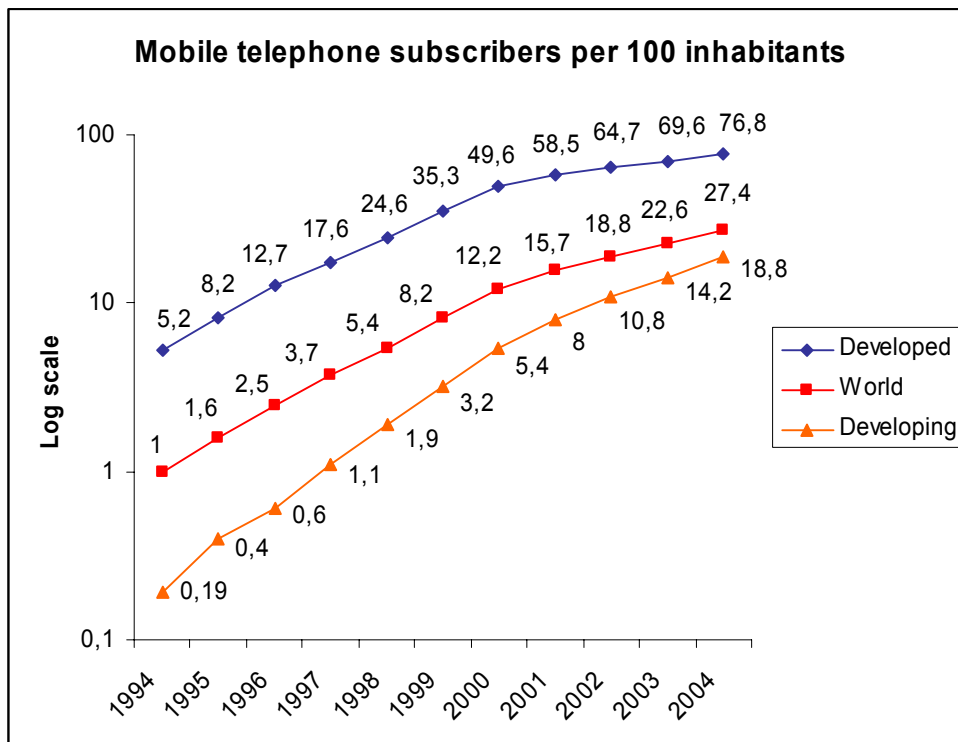


Figure 2. Mobile telephone subscribers per 100 inhabitants. Source: ITU

¹⁰³ Cell phones are very popular in some developing countries like Bangladesh, where Grameen-Phone provides mobile voice services to more than 6 million subscribers, according to the March 2006 issue of The Economist Technology Quarterly.

As a matter of fact, we can find daily examples of the use of software in all kinds of environments, including developing countries. For instance, some farmers in India are using software-based solutions to develop their agricultural exploitations in order to provide market information, extension advice, information about rural development programmes and other information from government and private sources¹⁰⁴.

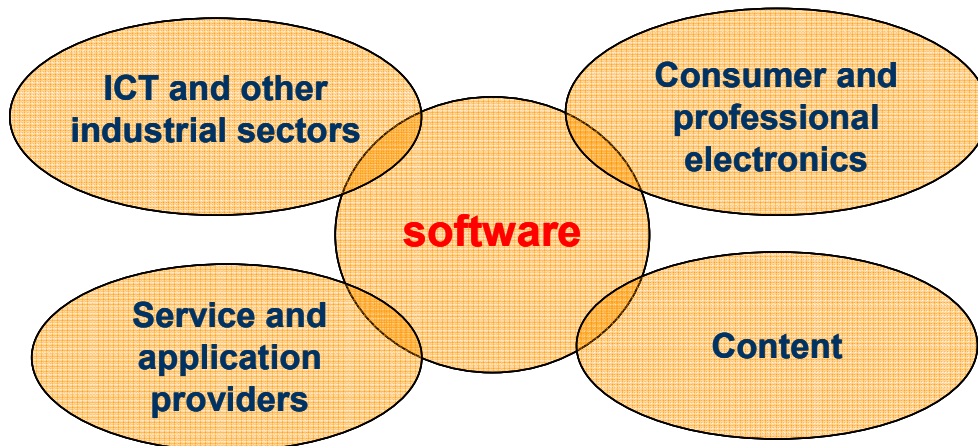


Figure 3. Some software-dependent industrial sectors.

Other examples of devices strongly depending on software are industrial machinery, medical equipment, consumer electronics, and cash registers at any store. The list is endless, since software has taken a vital importance in modern society and it is present, without being aware of it, in the daily lives of an increasing number of citizens. This is why software is considered an enabler for many sectors, from communications to entertainment.

3. Software as an enabling technology

According to what has been explained, software has an enabling role that makes it increasingly pervasive. On one side, software is a technology enabler, since it is the base for technologies ranging from ICT to machinery, and it is the element that provides intelligence and flexibility to hardware. In this sense, software also has the capability to satisfy users' needs in terms of interoperability and standardization, which are main issues at the present time.

On the other side, software is a real knowledge enabler, allowing the creation of user-friendly and environmentally-adapted technological solutions that drive citizens towards the Information Society. The adoption of ICT requires a greater knowledge of the uses and benefits of technology by the population in order to create a real demand of services and applications, and the creation of user-friendly, culturally-adapted applications and contents (which comprise respect for the language, religion and traditions of users) will ease the transformation of the population from 'people' to 'e-citizens'.

In this sense, technological literacy programmes aim at bringing citizens closer to technology by using general purpose equipment running computer programs with simple

¹⁰⁴ Meera – Jhamtani (2004)

interfaces which are adapted to the cultural environment of the users, be this through the use of their mother tongue, their local customs or their cultural symbols.

As a consequence of the aforementioned, software can be used to boost up the development of local cultures and to bring social progress to developing regions, since technology tends to reflect the cultural values of those who create it, and software is no exception¹⁰⁵. Moreover, the local use and development of software has an impact on production and marketing (the personalization of software-based products allows users to perceive technology as something closer to them), and it might lead to the creation of new, more profitable business methods.

Certainly, the development of valuable products, services, applications and contents, which are ultimately controlled by computer programs, explains the enabling capabilities of software and its growing importance, which is reflected by its ubiquity in the Information Society.

4. The economics of software

There are some characteristics of software that make it different from other industrial sectors from an economic perspective, thus bringing new opportunities to developing countries. First of all, entry barriers are smaller than those of most industrial sectors, due to software being less capital-intensive, more labour-intensive, with a lower rate of obsolescence and with fewer economies of scale¹⁰⁶. This is one of the greatest appeals of software as an element representing the backbone of ICT, since it is relatively easy to carry out local projects in developing countries. Software programming is a technique that requires reduced investments and capabilities that can be taught with limited resources, as opposed to other ICT sectors such as hardware or communications equipment manufacturing.

When creating new technology companies, the main advantage of software as opposed to other sectors lies in this factor. Countries or regions with qualified workers and minimum capital are prepared for the creation of companies, and can foster enterprising initiatives through the promotion of software technology parks (like the ones in India) or business nurseries. An example for the latter is SEBA (Society for Economic & Basic Advancement), a local NGO working to promote the rural livelihood and empower rural communities through developing micro enterprises in Bangladesh.

Additionally, software is strongly incremental¹⁰⁷ and code re-use is a common practice both by proprietary and Free/Open Source developers. This feature allows sparing unnecessary efforts on the development of state-of-the-art methods and algorithms, hence focusing on personalization or innovative steps.

¹⁰⁵ Lainier (2005)

¹⁰⁶ Heeks (1996)

¹⁰⁷ Blind et al. (2001) Section 2.2 “*Distinctive Features of the Innovation Behaviour in the Software Sector*”

As it has already been mentioned, software is a technology enabler and thus its particularities affect a large number of industries, far beyond ICT. As a consequence, software-intensive sectors are therefore increasingly incremental and they offer lower technological entry barriers to newcomers.

5. Software opportunities for education and development

As it has been shown, software is the base for any initiative towards an improvement of the adoption of ICT in developing countries (or regions), and therefore it provides a great number of opportunities to improve the lives of the population living in those areas. In this sense, actions over the demand of ICT services and infrastructures can be of two different types:

- Vertical actions: specific initiatives focused on one aspect of the Information Society, especially those regarding e-Government (which is out of the scope of this document), e-Education and the adoption of ICT in Small and Medium Enterprises (SMEs) to ICT.
- Horizontal actions: initiatives with a broader impact on society. The main vertical actions are those dealing with citizens (people), culture, local content and e-literacy.

However, none of these actions would have any sense in the absence of communication infrastructures and platforms; hence it is the first issue to be addressed by policies aiming at regional development through ICT. In this sense, the deployment of communication networks and platforms will be now briefly reviewed in order to later develop some of the aforementioned horizontal and vertical actions aiming to improve the adoption of ICT.

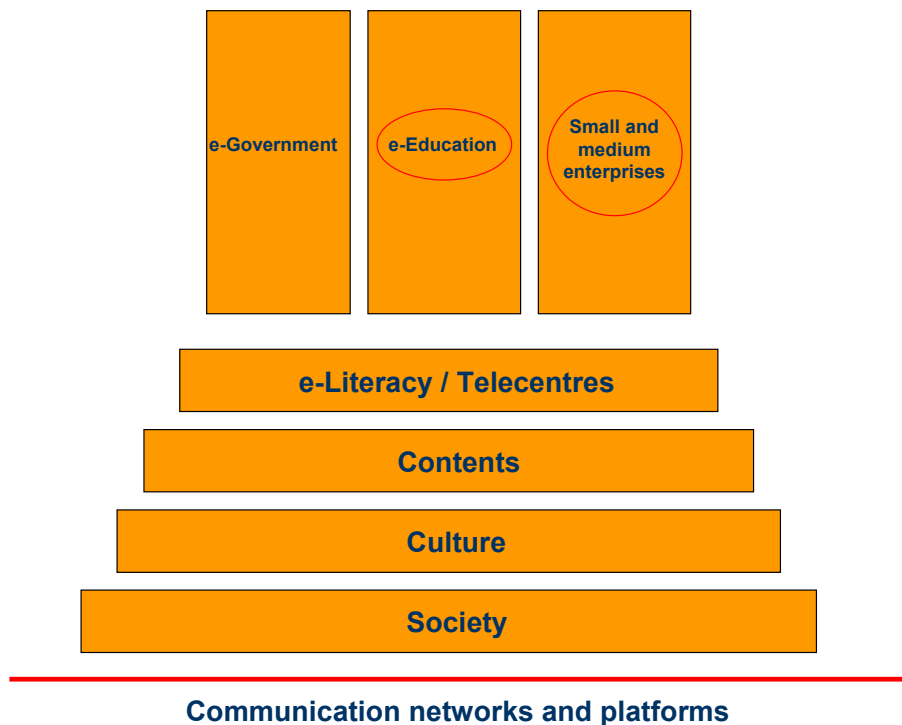


Figure 4. Types of actions focused on the adoption of ICT.

5.1 Deployment of communication networks and platforms

A major part of the Information Society promotion programmes have focused their efforts on the deployment of communication networks allowing the connection of users to the rest of the world. Some of them, such as the *Promotion and spread of the broadband services in Colombia*, have betted on broadband networks, generally based on xDSL technologies, while other initiatives choose wireless technologies. Such is the interest in WiFi for developing countries that the United Nations has established a Wireless Internet Institute¹⁰⁸ (W2i) under the auspices of the United Nations Information and Communications Technologies (ICT) Task Force.

However, access to communication networks requires platforms with interfaces providing connectivity, and in some occasions their high price can exclude those citizens with less income. Thus, the dilemma of prioritising the provision of communications at affordable prices or the availability of economic access platforms is faced. Some projects, such as the famous *One Laptop Per Child*¹⁰⁹ (OLPC) of the Massachusetts Institute of Technology (MIT), have developed low-cost computer platforms (\$100, in the case of the MIT computer) aimed at schools in developing countries. Nevertheless, this project has been criticised by Microsoft because they consider it would be a better idea to develop a portable device as an evolution of a cell phone with multimedia capabilities, since that technology is more widespread and incorporates the advantage of mobility.

¹⁰⁸ Official web site available at <http://www.w2i.org/>

¹⁰⁹ Additional information can be found at the project's web site: <http://laptop.media.mit.edu/>

In these cases, the production costs of the platform include on the one hand the manufacture of the terminal, and on the other, the cost of software development (or, where appropriate, the licenses). This was one of the reasons that led the MIT to choose Open Source for their platform since, in addition to facilitating the study and customisation of the operating system and the applications, the cost of the software licenses falls to zero.

As a matter of fact, Microsoft, the world leader in the operating system market, launched in 2004 a reduced low-price version of their Windows XP for emerging markets. The system, called Windows XP Starter Edition¹¹⁰, is being sold in several Asian and South American countries for 36\$, as opposed to the approximate 160€ (about 190\$) of Windows XP Home Edition in Spain.

5.2.1. Horizontal actions

From people to e-citizens

E-citizens interact among them and create virtual communities to share their knowledge and experiences or simply to meet other people with their same cultural background. Far from globalizing and standardizing human relations, e-citizens have the power to preserve and to foster their cultural idiosyncrasy.

Moreover, at a later stage, e-citizens can be trained as software developers in their own countries or regions, granting a double benefit to their societies: on one hand, they might promote job creation and on the other, there is an increase in the educational level of the population by providing them with specialised knowledge.

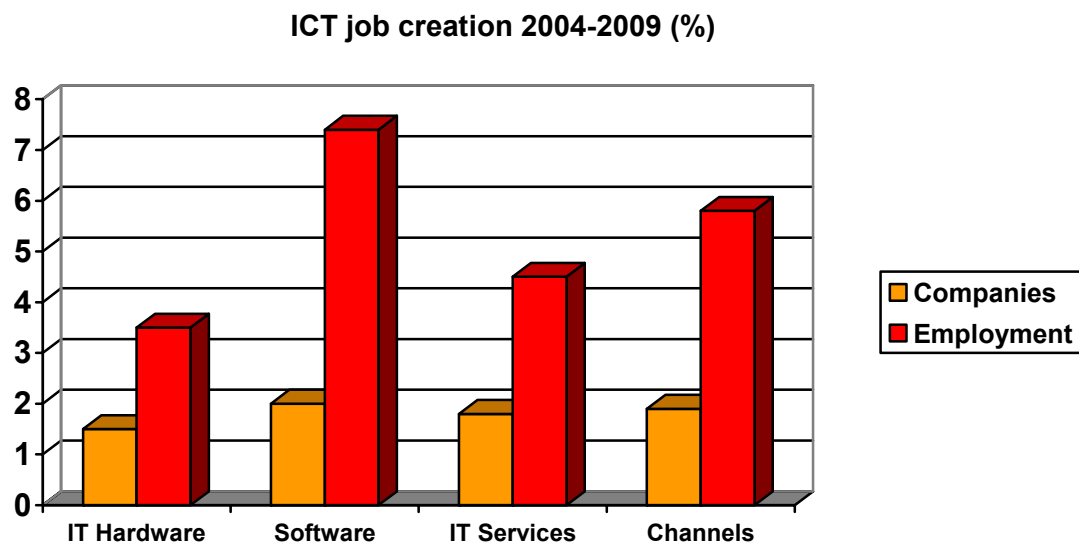


Figure 5. World ICT Job Creation 2004-2009. Source: IDC through BSA

¹¹⁰ Its characteristics can be seen in Microsoft's national pages of the countries where it is provided. In Argentina: <http://www.microsoft.com/latam/windowsxp/starter/default.asp>

To state an example, and according to data provided by IDC to the Business Software Alliance (BSA), Mexico increased demand for software by 19 percent and achieved the third-fastest Latin American IT sector growth between 2000 and 2004. Moreover, according to the same study, Mexico could generate 35000 more jobs, create \$1.1 billion in extra tax revenues, and grow 47 percent in IT between 2004 and 2009 if appropriate measures are taken¹¹¹.

Training software sector professionals can be achieved through internal training programmes in businesses or through state-sponsored technological education promotion programmes (creation of technology colleges, increase of university resources, etc.). In any of these cases, the number of specialised workers in the software sector is closely related to the possibilities of attracting investments for the externalisation of software production or the provision of added value services over ICT, which is why technological training becomes an investment for the future of any region.

5.2.2. Adaptation to the cultural environment

In a globalised market, the products consumed in one part of the world are often designed and created somewhere else on the planet, causing an abstraction of the existing socio-cultural differences between the different societies.

Precisely, this tendency towards globalisation leads users to increasingly appreciate the adaptation of products to their environment and, preferably, the local creation of said products. In the case of the ICTs, technology adaptation possibilities mainly fall on their software component, which is also the part that can be locally developed with more ease in developing countries.

¹¹¹ IDC study 2005, available at <http://www.bsa.org>

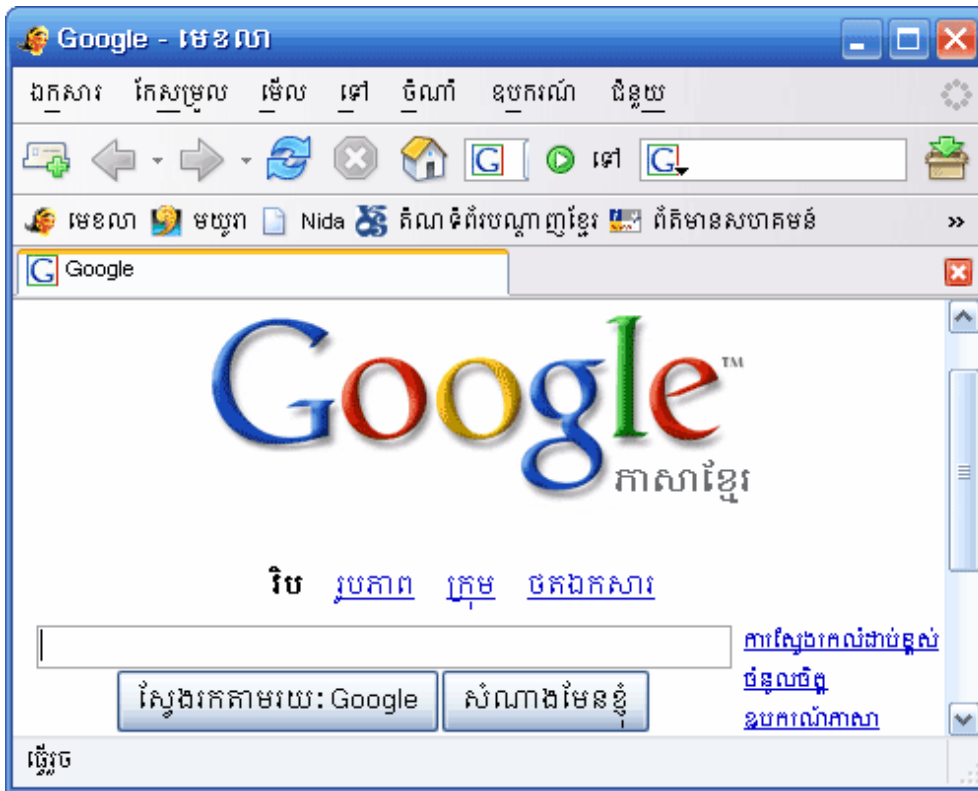


Figure 6. Screenshot from Mekhala web browser. Source: Khmeros Project

Some of the best examples of cultural adaptation are programs that are distributed under Free/Open Source Software licenses, since they usually include contributions from programmers from the communities targeted by the applications. A good example of this is the Khmeros project¹¹², an initiative for the preservation of the Cambodian language and culture through free software, which already has a Khmer version of the OpenOffice office automation software suite, an e-mail client based on Mozilla Thunderbird (Moyura) and a web browser (Mekhala) based on the popular Mozilla Firefox.

Certainly, the first sign of cultural adaptation of computer programs is the inclusion of friendly interfaces transmitting information in the user's mother tongue. Additionally, the existence of software applications allowing the creation and edition of contents close to the culture of the users also facilitates the assimilation of ICT.

Following this idea, some local culture development projects have created applications allowing users to create, share and access the knowledge of other members of their communities. An interesting example of the latter is the eNRICH project, driven by the National Informatics Centre of India and UNESCO, and consisting in¹¹³:

“A generic and yet easily customizable browser that acts as a gateway to a community's own world of knowledge, communication and empowerment. It enables communities to quickly and efficiently build their own gateway website, enriched with their own local

¹¹² Additional information can be found at the project's web site: <http://www.khmeros.info/drupal/>

¹¹³ Additional information can be found at <http://enrich.nic.in/>

content and connected to knowledge sources and services that are tailored according to their own information and communication needs.”

5.2.3. Technological literacy and telecentre programmes

The problems associated to the adoption of new technologies are often connected with the scarce technical capabilities of the users, making it necessary to familiarise citizens with the new technologies simultaneously with the deployment of infrastructures.

Technological literacy programmes are often carried out in the so-called telecentres, premises provided with ICT infrastructures and specialised personnel dedicated to teaching new technologies to the population located in the area of influence of the centre. These types of programmes have been developed in rural areas of Brazil¹¹⁴ or Chile¹¹⁵, but also in regions of Europe such as Andalusia (Spain), where the objective of the *Guadalinfo*¹¹⁶ project is to create a network of public Internet access centres in municipalities with populations with under 10,000 inhabitants.



Figure 7. Picture of a telecenter in Brazil. Source: <http://www.telecentros.sp.gov.br>

5.3. Vertical Actions

5.3.1. Local software developments and business creation

¹¹⁴ The *Alfabetização Solidária* programme is developed in 38 municipalities of the north of Brazil, in some of the poorest regions of the country. Additional information can be found at <http://www.alfabetizacao.org.br>

¹¹⁵ The *REDES* programme of FLACSO-Chile pursues the creation, organisation and fitting-out of 17 community telecenters, while the national digital literacy campaign has provided basic tools for computer handling and Internet access to over 630,000 people. Additional information can be found at the web site <http://www.telecentroscomunitarios.cl>

¹¹⁶ Additional information can be found at the project's web site: <http://www.guadalinfo.net>

The creation of a local software industry requires investments, qualified personnel and a know-how that must be generally provided by experienced companies, which leads us to the idea of several phases of local software development in developing countries.

First, technological literacy promotion processes must be started among the population for them to be familiarised with the electronic communications and informative environment.

Subsequently, a process for attracting foreign investments can be started for outsourcing software developments for foreign companies. Companies provide money and know-how and the host country provides cheaper labour. This model has proven particularly successful in India, where companies such as Tata Consultancy Services, Infosys Technologies or Wipro develop software for companies throughout the world.

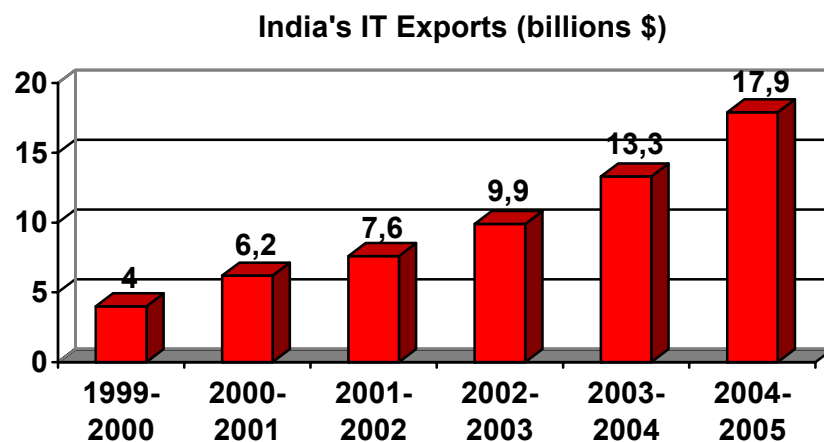


Figure 8. India's IT Exports. Source: Nasscom

At present, many companies are starting to apply this recipe for creating richness in their countries, from Luxoft¹¹⁷ in Russia to Softekt in Mexico or Politec in Brazil, hiring thousands of people specialised in software production, with the added benefit of working in time zones very close to, for example, those of the United States.

Last, the maturity of the software industry arrives while innovative companies prepared to compete at an international level appear. There are some examples of this in Russia, cradle of experienced programmers who are appreciated for their high degree of specialisation, such as the anti-virus software company Kaspersky Lab, developing one of the most highly praised anti-viruses by the specialised media¹¹⁸.

¹¹⁷ Luxoft, the greatest Russian software development outsourcing company, has developed a document management system for Boeing and a sophisticated customer management tool for Deutsche Bank, in addition to having IBM among their customers.

¹¹⁸ Some of the International awards received by their products can be seen at <http://www.kaspersky.com/awards>

Within the local software developments, the importance that the Free/Open Source Software model has in developing countries also stands out, both because of the lower costs of licenses for governments and organisations that back Information Society promoting programmes, and because of the educational and customisation capabilities provided by the openness of the source code. This type of project feeds on the voluntary contributions from programmers worldwide, who provide their talent to the production of software available to everyone.

In order to promote technology companies, governments can apply certain measures such as a favourable taxation (as in the Irish case) or the contribution of capital and infrastructures, thus favouring the implementation of both foreign companies and enterprising initiatives, while boosting citizenship participation in the development of the Information Society.

5.3.2. e-Education

Vertical actions focused on education aim at two main targets: on one hand, teaching citizens how to use essential software applications and, on the other, teaching computer programming to local population in order to produce software locally.

The expected result of the former action is the creation of e-citizens that are capable of demanding new services and applications either to improve their productivity as workers (typically with office applications such as word-processors, databases, spreadsheets, web browsers and e-mail clients) or to discover new forms of leisure (virtual communities, on-line multimedia contents, etc.).

Although software is relatively easy to teach, training local programmers requires some investments in computers, skilled teachers and, eventually, software licenses. This kind of knowledge can be taught at universities or in a more informal manner, according to the economic circumstances of the country. However, this type of initiative is largely beneficial for society, as it settles the foundation for the creation of a local software industry.

6. Some interesting experiences with software

Many are the Information Society promotion initiatives that have focused particularly on software as the basic element for the adoption of ICT in developing regions. In most cases, the promoters of this type of programmes choose free software-based solutions, due to their versatility and low cost, although there are also examples of the creation of proprietary software in local industries similar to the well-known case of Bangalore, in India.

The two experiences here presented have been chosen as representatives of two particular realities in terms of development. First, we will study how Brazil is adopting open source software in its public administration as a means of reducing license costs and fostering the local software industry. Brazil is an especially interesting case study, since it is one of the main economies in Latin America and many of its public policies have focused on

development (Open Source in public administration, generic drugs for low-income population...).

Next, we will observe how the regional government of Extremadura, one of the poorest regions in Europe, has decided to reduce the digital divide with other Spanish and European regions through Information Society policies based on software development. The authors have observed first-hand the impact of these initiatives on the Spanish society and how other regions are adopting similar measures in order to transform their populations into e-citizens through the use of software.

Open Source Software in the Brazilian public administration

During the last few years, the e-Government programme of the Brazilian public administration has experienced a significant change of direction, starting with the creation of two technical secretariats in charge of implementing open source applications and of the digital inclusion, respectively. This new organisation is clearly focused towards the goal of reducing the digital divide using software, and specifically, open code software.

Among the reasons leading to develop this model, the payment of software licenses to foreign companies had reached a figure close to one billion dollars, in a market of about three billion, causing a serious unbalance. The transition to a free model would allow saving on those costs and reinvesting the previous license expenses into the local industry.

On the other hand, e-Government applications handle confidential data of citizens, companies and public organisations, making information security a priority when choosing a specific solution. In order to resolve this, some proprietary software-developing companies sign specific agreements with governments and public administrations to disclose the internal operation of their software¹¹⁹, although the most transparent solution continues to be free software, the source code of which is fully available.

Another outstanding advantage in the implementation of open source systems for Brazil was the capability of locally producing software that was adapted to their requirements, was non-dependent of governments or foreign companies, and that promoted the national software industry and the achievement of a high degree of autonomy.

Last, code availability for the whole population has a public service function, since it allows openly sharing the knowledge generated in the country, especially by using the code as a subject of study in technical colleges and universities.

¹¹⁹ As a representative example, Microsoft, the world leader in software development, provides the Government Security Program. Additional information can be found at <http://www.microsoft.com/resources/sharedsource/Licensing/GSP.msp>

Among the most outstanding projects of the Brazilian government, a digital certification programme¹²⁰ has been undertaken. Attempts are being made to standardise it with other MERCOSUR¹²¹ countries in order to create interoperable systems, a digital inclusion through culture programme (using kits providing access to literary, video and phonographic material), another one for the creation of free software-based telecenters and a programme which is specifically oriented towards the indigenous people of Amazonia (Topawa Ka'a), representing a pioneering example of the digital inclusion of remote populations.

The screenshot shows the Gnuteca web interface. At the top, there is a logo for Gnuteca (a cartoon bird) and the text 'Sistema de gestão de acervo, empréstimo e colaboração para bibliotecas'. To the right is the SOLIS logo. Below the header, the breadcrumb trail reads 'Home :: GNUteca :: Pesquisar :: Detalhes'. On the left, there is a sidebar with search options: 'Pesquisas: Simplex, Multicampo, Percorrer Índices, Aquisições, Formato Padrão, Formato MARC, Voltar'. The main content area is titled 'Ficha detalhada' and contains a table with the following data:

Campo	Conteúdo
Título	Quem mexeu no meu queijo?
Autor	Johnson, Spencer
Edição	36
Idioma	POR
Local	Rio de Janeiro
Editora	Record
Ano	2002
Detalhes Físicos	107
Assunto	Auto-realizacao - Psicologia Mudanca - Psicologia Psicologia Motivacao - Psicologia
Entrada Secundária - Nome Pessoal	Biase, Maria Clara de - trad.
Classificação	159.947.5 J69q
Volume - Exemplares	Único - 1 exemplar(es)
Total de itens	1

At the bottom of the table, there are two buttons: 'Ver Exemplares' and 'Reservar'.

Figure 9. Screenshot of Gnuteca, a free library management software (www.gnuteca.org.br)

Extremadura in the Information Society

According to data from the Spanish National Statistics Institute (*Instituto Nacional de Estadística*)¹²² (referred to 2004), Extremadura holds the last position in the ranking of Spanish regions based on per capita GDP, with a figure of 12,886 €, as opposed to the 21,800 € of the Spanish average or the 22,300 € of the EU-25 average¹²³, which is the reason why it is among the European regions considered as “objective 1” in cohesion policies¹²⁴.

In this situation, the public administration of Extremadura has chosen, since 1999¹²⁵, to promote the Information Society as a way to develop the region and reduce the digital

¹²⁰ The name of this programme is João de Barro, and additional information can be found in the project's management web site, <https://www.labsec.ufsc.br/tiki-index.php?page=Joao+de+Barro>

¹²¹ Southern Cone Single Market, including Argentina, Brazil, Paraguay and Uruguay.

¹²² Information available (in Spanish) at <http://www.ine.es/prodyser/pubweb/esp/cif/cuen05.pdf>

¹²³ Data obtained from Eurostat (2005).

¹²⁴ “Objective 1” is the consideration given to regions with a per capita GDP below 75% of the EU average.

¹²⁵ On June 21, 1999 the Consejería de Educación, Ciencia y Tecnología was created, assuming the responsibilities in matters of Information Society in Extremadura.

divide with the rest of Europe. Thus, an ambitious plan of extending broadband networks with ADSL was started, telecentres have been created in several towns, and ICT infrastructures have been provided for all the schools in the region.

However, the most noticeable action of this strategy has been the implementation of free software created in Extremadura in all the public information systems (education, public administration...). The base of this initiative is the GNU/LinEx distribution¹²⁶, a version of the popular GNU/Linux operating system adapted by and for the people of Extremadura¹²⁷.

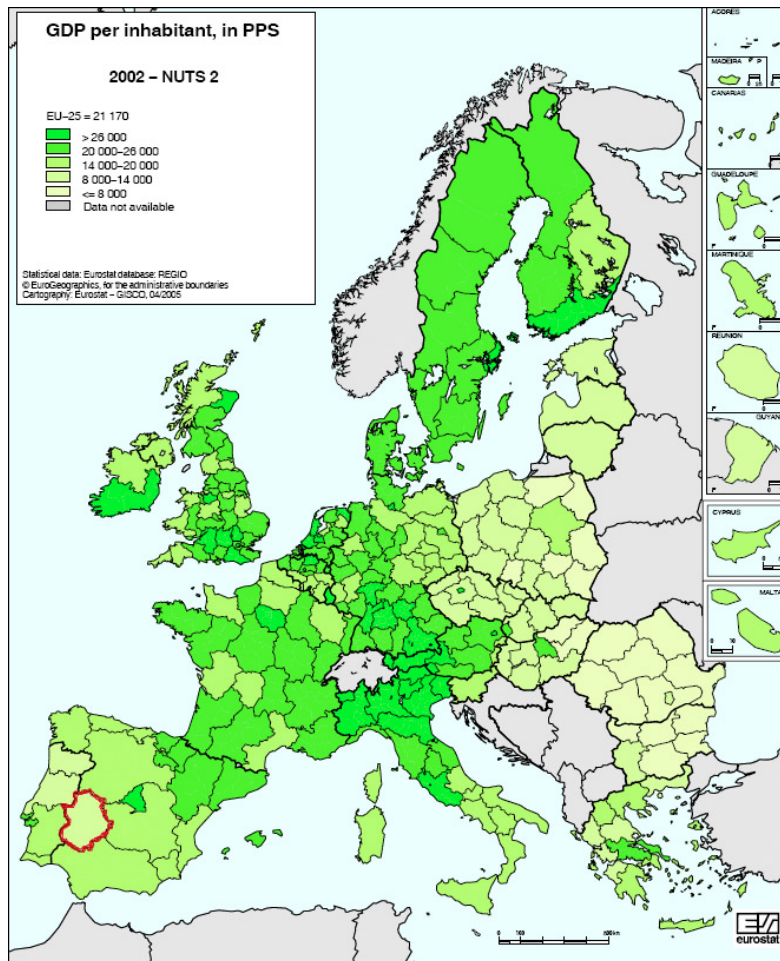


Figure 10. GDP per capita in Europe (Extremadura highlighted). Source: Eurostat

The creation of software in Extremadura provides numerous benefits for the region and its citizens, beyond the saving of license-related costs. First, GNU/Linux, as a free project, receives contributions from programmers from all around the world who contribute to the improvement of the applications developed in Extremadura. Also, the

¹²⁶ Additional information can be found at the project's web site: <http://www.linex.org/>

¹²⁷ Linex had a strong impact in world media, and was even highlighted in Wired magazine (*Extremadura Measures: Linux*) and the cover of The Washington Post's Sunday edition (*Europe's Microsoft Alternative*).

project has needed to train programmers, who represent the base for the creation of a local industry supported by the regional administration through a technology business nursery called Vivernet¹²⁸. In fact, according to Eurostat¹²⁹, Extremadura is among the European regions showing a greater growth in the creation of jobs in knowledge-intensive services, with an annual average growth rate between 1999 and 2004 of 10.2%.

On the other hand, resources for teaching in schools have been improved with the incorporation of software tools that allow teachers to create educational contents easily. The main example of the above is Squeak¹³⁰, a multimedia and multiplatform tool (it operates on LinEx, MacOS, Windows, PocketPC...) that allows developing contents, doing programming exercises for inexperienced users and children, but also supports high-level programming in Smalltalk for people with greater computer skills.

Last, we must mention that the pioneer initiative undertaken by the Government of Extremadura has given birth to an important number of collaborations with other Spanish regions (Andalusia, Castilla-La Mancha...) and Latin American countries (Brazil, Colombia...) that aim at making software a basic instrument for development.

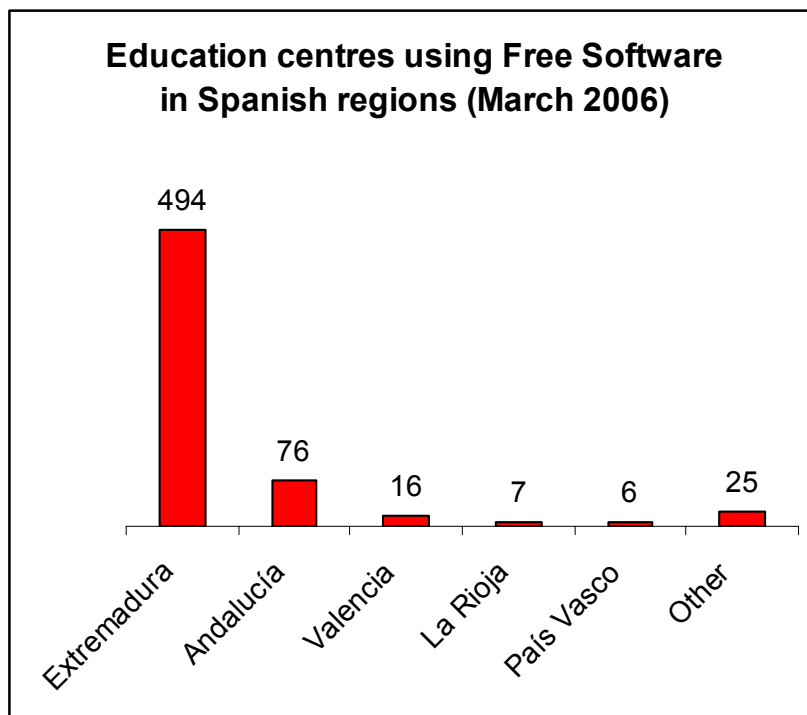


Figure 11. Education centres using Free Software in Spanish Regions (March 2006).
Source: Spanish White Book of Free Software (<http://www.libroblanco.com>)

7. Conclusions

¹²⁸ According to data from the study of the socio-economic impact of ICTs in Extremadura by MERIT (to be published in 2006), Vivernet-supported firms are more innovative, more prone to the commercialization of new products and they employ higher profile professionals than the average.

¹²⁹ Eurostat (2006).

¹³⁰ Additional information regarding the initiatives based on Squeak at <http://squeak.linex.org/>

During the second phase of the World Summit on the Information Society held in Tunis in 2005, world leaders committed to turn the digital divide into digital opportunity, and to ensure harmonious and equitable development for all, as well as to encourage the realization of multilingualism in the Internet development environment, and to support the development of software that renders itself easily to localization, and enables users to choose appropriate solutions from different software models including open-source, free and proprietary software¹³¹.

In order to reduce the digital divide, policies aiming at the development of the Information Society must consider two main issues. First, there is a need for appropriate infrastructures and platforms as a prerequisite to supply new services and applications. Then, policies must focus on adoption, which is related to the willingness of users to make use of the new opportunities brought to them.

In the context of adoption, software acquires a vital importance as a technology and knowledge enabler, since it supports their capabilities of mobility and interaction with users, as well as the connectivity and customisation of the products, all of them vital to improve the levels of adoption and knowledge of new technologies.

Additionally, if we consider that the software sector has some of the lowest entry barriers of all ICT, we will conclude that the opportunities to reduce the digital divide while improving the economic and educational levels in developing countries are numerous:

- Software is an enabling element in the development of the information society, particularly due to its capabilities to build ubiquitous, personalized and culturally adapted applications and services.
- Innovative industries are often out of the scope of developing countries due to high entry barriers or too specialised know-how. Software can be the base of local innovation because it is a sector with low entry barriers and state-of-the-art programming can be acquired with reasonable effort.
- Training software developers raises the level of specialisation of citizens and allows the creation of local technology companies which will provide jobs, be it directly or indirectly, to people locally.
- Open source software is an alternative that should be considered by public authorities when designing their information systems for education, health and e-government, since it links IT expenditure with local development.
- Vertical actions towards an increase of the levels of ICT adoption in developing countries can make intensive use of software. As an example, vertical actions in the field of e-education aim to increase the usage of software, but also to train new software developers that will eventually work in the local industry.
- The adoption of ICT also requires horizontal actions aiming to include people and their culture in the Information Society. The adaptation to the cultural environments of users allows them to perceive technology as something of their own and to use it to strengthen the cultural bonds with other members of their community, becoming e-citizens.

¹³¹ WSIS (2005)

The bottom line is that, considering these advantages, software should become a key element to be considered explicitly by international organisations and national governments in their Information Society promotion policies, since it has a direct effect on the adoption of new technologies and on the promotion of cultures and knowledge.

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2.4 Open Source in Education and Development. History and Practices of Open Source around the world

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Introduction

"Open Source" is a phrase that has taken over the literature of geeks and wonks alike. In much of the developed and developing world, technologies that have "Open Source Inside" are in high demand. Open source is used to run printing presses and oil rigs. Open source is teaching children and running the UN's website. India's president has declared that "open source code software will have to come and stay in a big way for the benefit of our billion people". Open Source is taking on more and more significance in the Information and Communication Technology (ICT) sphere due to several significant advantages over the alternatives. Open source is not a panacea or the only part of ICT's future. It reflects both a concrete set of technologies and an abstract, almost philosophical approach to information. As information and the skills to apply it are some of the scarcest resources in many areas, Open Source provides some tools and an approach to education and development in Africa and the whole world.

The term "open source" has a somewhat controversial history in the technological literature. It shares its core meaning with the older phrase "free software", but was coined in 1998 to avoid any anti-capitalist overtones. "Open source software" is software that both protects the rights of its creators and also grants many freedoms to the rest of the world that will actually use the software. The group originating the term defines it with a ten-section document that is intended only as a brief summary. Today, learning and business literature capture ideas of transparency and governance with the term open source.

In today's world of bridging digital divides, open-source software has a number of strengths: 1) it is free to use for any purpose; 2) it is free to study and adapt; and 3) it is free to redistribute. For education and development, the benefits are among the following: 1) no up-front costs; 2) no restrictions on usage for research, in schools or homes; 3) no restrictions on distributing the software to where it's needed, when it's needed. The United Nations Development Programme's Human Development Report asserts that development is about "... enlarging people's choices." [F2]

How did the UNDP and the president of more than a billion people come to mention open source? And how does open source matter for education and development in developing nations? The following sections comprise some historical and practical information of interest to researchers and others in Education and Development. For those short on time, it may be useful to start with the practical questions and answers in section 3 and refer back to section 2 when clarification of terms or background is required. The best place to start, however, is at the beginning: with a definition of "Open Source" and relevant history.

1. Background and Definition of Open Source

"Open Source" as a term was coined in Palo Alto, California, on February 3rd, 1998, by a group that later incorporated as a registered charity called the Open Source Initiative

(OSI).[F4] It became popular in the computer programming community very quickly. In order to understand what those in 1998 meant and how it is relevant to us today, some background is necessary.

1.1. Background

"Open source" is defined by the OSI in ten specific ways requiring only literacy to read but advanced technical and legal degrees to fully understand. Even the authors of the definition have to consult with large groups of paid professionals to comment on the ramifications. The programmers, engineers, and lawyers involved are justifiably skeptical of oversimplifications. For purposes of understanding the intents and consequents in non-technical terms, the Definition section should be considered a "crib sheet". Despite these caveats, unless one goes to court or to certain hacker enclaves in California and Boston, there will be few disagreements with that section

The term "open source" applies to software. What motivated the OSI to come up with the term was an outgrowth of the belief in some freedoms first espoused by Richard Stallman, and later the Free Software Foundation (FSF). Stallman believes that people who use software should have the ". . . freedom to run, copy, distribute, study, change and improve the software." [F3] This is what people are meant to think of when the term "open source" is used, although this belief comes originally from Stallman's "free software" movement.

"Open source" applies, very specifically, to software licenses. Software today is not sold, it is licensed. This allows the copyright owner -- henceforth called just the owner -- to control what the customer can do with the software. Just as Disney wants to control Mickey Mouse, the software copyright owner wants to control their product. There are many debates about the applicability of patent law, copyright law, property law, and just about every kind of law to software. What concerned the open source advocates was striking the right balance between the owner and the consumer. As "owners" themselves, they nonetheless were also "consumers": no one person has the time to create all the software they need to do useful things with a computer.

The history and tactics of the "open source" and "free software" movements have been very different [F7], but their practical goals and philosophical roots are of the same mien. "Free software" is commonly held to have more accurate connotations -- think free as in speech, not as in beer -- but "open source" is held to be more acceptable to those suspicious that the free software movement wants to abolish property rights or capitalism (it desires neither). From here on, the terms "open source" and "free software" shall be used interchangeably.

1.2. Definition

"Open source software", and "free software", mean software licensed in such a way that grants the following freedoms to the users of the software:

- 1) The freedom to run the program, for any purpose.
- 2) The freedom to study how the program works, and adapt it as needed.
- 3) The freedom to redistribute copies so you can help your neighbor.
- 4) The freedom to improve the program, and release your improvements to the public, so that the whole community benefits.

Legally unfettered access to the source code[F9] of the program is a necessary precondition of freedoms #2 and #4. These freedoms are the essence of free software[F8] and the created the principles of the open source movements[F9]. Some examples of the presence and absence of these freedoms are:

- 1) The freedom to run a piece of software for any purpose: Microsoft Word can be used to write papers critical of any form of government, but Microsoft Word cannot be used to collect data for an article comparing its speed to another word processing program without the permission of Microsoft;
- 2) The freedom to study how the program works, and adapt it as needed: Mozilla Firefox can be studied and adapted to play a tune every time a web page is loaded, whereas most DVD playing software cannot be legally adapted to play DVDs sold in a different part of the world from where the user lives;
- 3) The freedom to redistribute copies so you can help your neighbor: Mozilla Firefox can be put on a CD and posted to your grandmother; Microsoft Windows XP cannot legally be installed on any other computer than the one you bought with it installed; and
- 4) The freedom to improve the program, and release your improvements to the public, so that the whole community benefits: I can adapt Mozilla Firefox to play a tune (as in example #2) and then distribute that feature on my blog; I cannot redistribute any modifications to Microsoft Windows XP's source code (though some may be available to study).

2. Practical Questions and Answers

2.1. Why should I use open source?

It's free (costs nothing) and it's often just what you need to solve a particular research problem. Open source is not a panacea and will not automatically be better than anything else. You can often shape the future progress of the software, though, so don't hesitate to politely ask. You might also be interested in the non-monetary benefits of open source, so glance at the previous section – yes, the one right before this question -- to see why you can feel good about using open source besides just

getting more out of your research grants.

2.2. Why shouldn't I use open source?

All other things being equal, using open source will generally be to your advantage because you will be able to influence the future development of the software and be of much less overall cost than the alternatives. But all other things are rarely equal, so if you do end up having to use something that you have to pay for and can't "get under the hood" of, it's worth emailing the closest open source alternative's mailing list (they all will have one – search for "theopensourcething developer mailing list") with a polite challenge like "can your software do X anywhere near as well as the non-free software package Y", because there's nothing an open source programmer likes more than to prove their creation is better than an alternative. You might be surprised.

2.3. Who will help me with a problem with my open source software?

One of the benefits of most open source software is an active user community. Search out the mailing list or web forum for the software and connect with the other people using it. They will often be able to help much quicker than the developers if you have a problem. The developers will often be stressed, working in their spare time, and not interested in answering questions that have been answered before (those circumstances may even resonate with some readers). There are even guides to how to ask a good question[F20], if you are fortunate – or desperate – enough to ask one of the developers.

2.4. How can I find some open source software?

Ask your friendly neighborhood "techie". Ask them if there is anything on freshmeat.net[F21] or other open source software sites. They will often be very happy to offer suggestions. If you don't have one or they are too busy, try the web, of course. Search the web and don't be afraid to mail a few projects' mailing lists with "I'm new to this but your software X is interesting; but after reading your website I was still not sure if does Y. Is that in the works?"

2.5. Will I have to convince anyone that open source isn't "bad"?

It's unlikely. It's generally not an issue for anyone who's not a techie with an ax to grind (techies are almost always in favor or neutral, but some may be threatened of the new or different). Anyone objecting to your use of an open source package – remember you're using it for some reason besides it's open source – might object because there is already something paid for that you should be using. In that case, of

course, it's not really an open source question and you'll have to really ask yourself what you're gaining. If they object in some more general way about open source – perhaps they think it's not secure, or not high quality enough – they probably don't really know what they're talking about, frankly. Both security and quality examples are easy ones to refute with facts, but it's likely not going to be worth your time to argue about them; just find a techie to do it for you.

2.6. Will I be in trouble after my project starts because my open source software gets abandoned?

Even less so than with a non-open source project. Remember, you can always pay someone to make the changes you need to an abandoned project, because it's open source! In practice, you can always see clearly if a project is abandoned or in danger well before you get committed: check the website to see when the last version was released. If it wasn't recent and the web site says it's “unfinished” or “not abandoned” or similar, then it probably is both unfinished and abandoned. If quick web search only turns up some forum posts or emails from ages past, you can move on. But if you see an active community and recent releases, you don't have to worry.

2.7. How will open source solve my problem? Will open source solve world hunger?

Open source is a way of developing software. So it's not a solution to every problem and it's just as non-nonsensical to ask “how will a free crop-rotation manual solve world hunger”. Notwithstanding, some see open source software as more “socially responsible” than closed-source software because its development process actively encourages the free exchange of ideas, rather than discouraging that or trying to make money off of it. These are not tremendously practical concerns, however, to the average education and development project. Open source software will be cheaper than alternative, but it can only assist you in some of the hard parts of designing, promoting, implementing, and fostering your project to completion (or self-perpetuation, as the case may be).

2.8. Do I have to use open source for everything if I use it for one part of my project?

Certainly not.

2.9. Won't open source just be a waste of my time?

Not if time is money and you don't have an infinite amount of either. But you're right to think that open source needn't be a consuming goal in its own right. Have a

glance at the answer to question 3.10.

2.10. I don't understand how this is all relevant to me, nor do I want to read all these other sections.

That wasn't really a question, but the most useful response is: go forth and continue your primary projects. But whenever you search for software on the web, add the words "open" "source" to your search. You'll probably find some useful and free things, and you won't need to worry that you're saving the software planet or anything (though you are). If you want to pay for software, go ahead too – it's your grant money!

3. Examples of Open Source in Education and Development

Free and open source software (FOSS) is suited to many of the constraints and requirements of the Education and Development area. Free software is free of cost. It is also open to modification and redistribution without legal or monetary penalty. From these two fundamental advantages spring some second-order advantages: a) lower cost of adoption means more adopters; b) ease of modification means more modifications (features); and c) ease of modification removes the "lock-in" motivation for software authors to prevent compatibility with other software.

Despite many breathless press releases, however, FOSS is not a panacea. Lack of marketing and polish might make a free software program look backward or harder to use when compared to a flashier but less featureful non-free product. Rapid modifications often make open source look like it's unstable. And sometimes open source projects just get abandoned by the author. Following is a brief summary of some successes and failures in the education and development area so that the reader may form an informed opinion.

The breadth of FOSS's advantages and disadvantages indicates that there are few general answers to the question of "is open source right for education and development?" The right answer is: it depends. It is demonstrably true that in many areas, open source software is better than its non-open source software competition. The converse is true, too. What distinguishes successes from failures? Few authoritative results exist, though the acres of trees sacrificed to business improvement books suggest that it is not for lack of trying.

One area where open source directly aids education and development is localization. Localization and the related area of accessibility refer to the features of a software package that enable it to be used by persons who do not share the language of the software author or are disabled (respectively). The need for localization today is primarily driven by countries with extremely large non-English speaking populations.

Most non-free software is written for an English-speaking audience due to the English-speaking roots of the software development industry and the relative affluence of the English-speaking customer base. The explosion of internet usage in countries like India, China, Japan and South Korea[F11] has created a user base without the need to pay for existing non-free software solutions. A copy of Windows XP Home Edition with student discount costs around USD 75, around 12% of the average gross income. Open source software can be localized by anyone with the technical skills, at no cost. Given the knowledge and motivation of many of the "reverse brain drain" professionals[F12], these countries no longer lack the training required to make such changes. Accessibility concerns are often similar or even more demanding of specialist knowledge than localization; this, coupled with the smaller customer base, makes it a low priority for most non-free software developers. Whereas non-free software would provide significant monetary and legal barriers to these types of changes, free and open source software is often the natural choice. Software packages like Ubuntu Linux[F13] are often explicitly geared towards the needs of localized and disabled people; there are a number of efforts to produce Nigeria-focused open source software translations[F14].

The open source and free software communities began as groups of technologists addressing their own software needs as a reaction to the corporate software company business model. Almost none of that immediate context was shared by the educational or development space. As a result of first individual, then also corporate, efforts, however, both the educational and the development spaces have been further influencing, and influenced by, the open source community. There are a number of trends that are likely to continue in the next five to fifteen years. Following is a holistic collection of trends, observations, and literature resources for the interested reader.

3.1. Examples

3.1.1. Geekcorps

Geekcorps is an organization that "promotes economic growth in the developing world by sending highly skilled technology volunteers to teach communities how to use innovative and affordable information and communication technologies to solve development problems." [F17] Geekcorps is non-profit and based in the US. It is concerned with transferring ICT skills to developing nations. Professing to more than 3,500 volunteers available to work with local people, Geekcorps organizes three to four month funded assignments that are usually performed in conjunction with ICT small businesses. One project in 2001-2002 sent an engineer to on of Ghana's Internet Service Providers (ISPs), who worked with the local staff to significantly lower the cost of key infrastructure hardware whilst increasing the skills of a large number of employees.

3.1.2. translate.org.za

Translate.org.za is an "open source software translation project" that has been working to translate popular open source software into some South African languages. Openoffice.org is the most popular open source office suite; it includes word processing,

spreadsheet, presentation, and drawing programs. Translate.org.za recently completed translating the latest version of OpenOffice.org, 2.0, into South Africa's eleven official languages. The head of the organization believes that this localization work has even broader benefits than just to one piece of software: their work helps ". . . stimulate the proprietary industry to start localizing their software". [F18]

3.1.3. The Shuttleworth Foundation

The Shuttleworth Foundation[F19] exists to improve the quality of education in South Africa. The foundation focuses on maths, science, and technology education projects. The founder and project approach are closely related to open source ideas and software. The founder, Mark Shuttleworth, is also the founder of the Ubuntu Linux “distribution”, which is an operating system like Microsoft Windows but one that is more localized, free, and open source.

3.1.4. K12LTSP

The K12 Linux Terminal Server Project (K12LTSP) is a set of software designed for people who want to create a reliable school computer lab with the minimum of hassle and expensive equipment. The project is well suited for environments with one person in charge of a computer lab that is only one of their many responsibilities.

4. Conclusion

Open source and free software are ways of producing and distributing software that are extremely relevant to today's tech-savvy world. It is free of cost and can be freely distributed. The lack of monetary and legal restrictions have led to the quick – and legal – spread of good open source software, not in the least because there is no large global multinational corporation restricting anyone's participation. The producers of open source software – called “developers” -- are, in general, more independent and meritocratic than most; this leads to higher quality in some areas but also leaves many software needs neglected when they lack an interested developer. Open source is not a panacea to any problem, but can foster the education, training, and development of the people that use it. It can enable development solutions by its existence, its availability in local languages, or its lower cost. Its accessibility and community-oriented development process means that anyone can participate. A by-product could be a more skilled labor force, though the inherent complexities limit this growth and mean that open source software is not intrinsically easier to use or keep running than the alternatives. There are few incentives to not use open source if the choice exists, however, and the popularity of open source within the technical community means that the number of cheaper, free-er, and faster-moving software solutions for education and development will continue to rise. Open source can be very useful as a considered and measured part of education and development in more places around the world than any other class of software.

References

- F1. <http://www.opensource.org/advocacy/faq.php> According to the Open Source Initiative's usage guidelines, "Open Source" is a noun, etc.
- F2. <http://hdr.undp.org/hd>
- F3. <http://www.fsf.org/licensing/essays/free-sw.html>
- F4. <http://www.opensource.org/docs/history.php>
- F5. <http://www.fsf.org/licensing/essays/free-sw.html>
- F6. *ibid.*
- F7. <http://www.fsf.org/licensing/essays/free-software-for-freedom.html#relationship>
- F8. <http://www.opensource.org/docs/history.php>
- F9. <http://www.fsf.org/licensing/essays/free-sw.html>
- F10. Source code is the set of instructions, expressed in a particular programming language, that can be transformed ("built" -- by another program!) into a runnable program. Source code -- never "source codes" -- is thus the butt of many analogies along the lines of: source code is to a program as a recipe is to a souffle; or: source code is to a program as a blueprint is to a bridge. Both analogies are oversimplified but capture the essence in this respect: if your souffle was too sweet, you are going to need the recipe to improve it.
- F11. <http://www.internetworldstats.com/stats3.htm>
- F12. <http://www.sciencemag.org/cgi/content/full/307/5714/1415>
- F13. <http://www.ubuntu.com/>
- F14. <http://www.wazobialinux.com> and http://www.igbolinux.org/wordpress/?page_id=10
- F15. <http://africalinuxchix.org> and <http://www.tectonic.co.za/view.php?id=845>
- F16. <http://www.fossfa.net>
- F17. <http://www.geekcorps.org>
- F18. <http://translate.org.za/>

F19. <http://www.shuttleworthfoundation.org.za/>

F20. <http://www.catb.org/~esr/faqs/smart-questions.html>

F21. <http://freshmeat.net>

2.5. A Curious Divergence: The Generational Encapsulation of ICT Advocacy

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This essay proposes that external perceptions of corruption for non-industrialized countries will continue to grow as rates of software piracy decrease for the same countries. The essay is based on an analytical research project that used data from two primary sources – (1) The Eighth Annual Business Software Alliance (BSA) Global Software Piracy Study: Trends in Software Piracy 1994-2002 and (2) the individual 2000, 2001, 2002 Corruption Perception Indices of Transparency International – and controlling for Adult Literacy Rate, Gross Domestic Product, Internet hosts, Internet users, Personal computers, and Fixed line and mobile telephone rates. The first observation – while simple – is that perception is intangible and therefore a perception rate is much harder to assess than, say, a rate of action. The essay proceeds with full awareness of this constraint.

Corruption perceptions and rates of software piracy are to some extent the monitoring and evaluation (M&E) functions of an international business community – Bretton Woods lending institutions and multinational corporations – grading countries on their internalization (and projection) of prescribed policies and sanctions such as structural adjustment and trade agreements imposed by the business community itself. States wishing to remain in favor with donor countries, governments and political administrations often submit to good governance initiatives – e.g. transparency, accountability, anti-corruption, media democratization – that are requisite programming within broader donor assistance packages consisting of water sanitation, food security and/or public health components. Good governance initiatives in turn create the standards on which corruption and piracy (in any sector) are benchmarked.

Systems of Power:

Without intending to generalize, it is the case for many countries in the global south that they are or have been rentier states, clientelist administrations or monoculture production sites for countries in the north, often with a new and/or strained relationship to a particular government type (democracy, socialism, etc). With specific regard to the software industry (and more broadly the IT sector), it is understood that there are two different systems at play, thus creating a unique dialectic from which technology achievement can be assessed in generational terms. One system is the *historical* power structure that bridges colonialism with post-colonialism and the other is a *new* system emerging in tandem with information technology. In that indicators of corruption are relativist constructs as much as they are the codification of universal values, entrenched power elites intent on maintaining influence can manipulate the conditions for production with industries focusing on historical or *old* resources. This is not always the case with newer commodities, especially those that have virtual characteristics such as software. The latter industrial system is a networked one – with fewer hierarchies as of yet – and not bounded in the same (old) ways by physical borders and patterns of dependency entrenched by the monolith of global capital. For many places in the south, the advent of software production or replication (and implied popular access and functional use) was accompanied by (a) the growth of a youthful IT sector; (b) stirrings of a worldwide social technology movement; and (c) activism for open source software (OSS). So, while the IT

sector is emerging, it is creating its own advocacy at a compatible rate and perceivably has more agency on this new, non-geographic frontier.

These conditions create a cumulative regulation effect for software production and piracy with market interests triangulated by (1) totalitarian states and rulers within the historical system on one side, (2) the convergence of global capital (neo-liberal economic order) on another, and (3) Civil Society on the third side, with individual activists helping to formulate IT policy at a competing rate with the totalitarian agents that justify monopolization of resources in the IT sector based on historical precedents. In an interview with Saskia Sassen, she states:

Government and corporate elites in many of the developing countries are developing vested interests that coincide with the process of economic globalization.

Global capital represents interests of the international business community and tends to reify totalitarian agents for lack of newer precedents based on the local internalization of world system consequences and a direction toward innovation with new commodities that are not tied to the land or limited by geographical boundaries.

Africa as Proxy

To further explore these policy-related assumptions, it is helpful to look at two states for which software piracy data is available from period 2000 – 2002 (Nigeria, Zimbabwe) and to consider one for which the data has not been collected (Tunisia).

While anecdotal, these African countries perhaps best illustrate the complexity of corruption assessment in geographic areas where members of the west are domestic policy stakeholders with economic interests.

Nigeria:

In keeping with the statistical findings of the study, Nigeria's software piracy rate for 2000 was 67%, increasing to 71% in 2001 and reverting to 67% in 2002.

Some critics – the Independent Advocacy Project (IAP) among them – use the perennially poor marks given to Nigeria by the Transparency International Corruption Perception Index as justification that the administration of Olusegun Obasanjo is not living up to the expectations of external stakeholders in the countries fight against corruption. However, the Obasanjo administration has created new government organs to deal with various corrupt practices; among them are the Independent Corruption Practices Commission and the Economic Financial Crimes Commission (Concern Over Corruption Ranking). According to Transparency International, Nigeria's corruption rating increased from 1.2 to 1.6 between 2000 and 2002.

Here it is helpful to understand that, often times, software piracy and internet fraud are interlinked in terms of perceived practice. Email extraction software, while commercially viable for general marketing practice in many countries gets tagged ‘software piracy’ in those places where intellectual property regimes do not condone its import and usage. This is further complicated when such software is used to engage in 419¹³² email scams that intend to trick their targets out of money and are based, generally, on a pyramid scheme. In addition to broad public-sector reform, Nigeria has implemented a targeted taskforce to deal with this problem and cooperate with multilateral enforcement agencies.

In a recent case:

Twenty-eight Internet fraudsters have been arrested in Lagos, in joint operations between the Economic and Financial Crimes Commission (EFCC) and the FBI. Also, USD 3.5 million was recovered in fraudulent cashier cheques and goods bought over the Internet and shipped to Nigeria by credit card scammers ... [United States Attorney General] Ashcroft noted that cyber crime was a major global source of worry adding that only committed governments and cooperative efforts between law enforcement agencies around the world can effectively tackle the menace (The Daily Champion).

Nigeria is working to improve its image as an ‘oil rich nation’ understanding that it may be necessary in the future to impress developed countries and the lending institutions they control in order to export and refine its primary natural resource – petroleum. One example has been the signing of a Bilateral Non-Surrender Agreement between Nigeria and the US that, while exempting the countries from International Criminal Court strictures as a primary function, codifies US assistance for the abatement of Nigeria’s 10% annual oil bunkering (heisting) problem. Here we see that the US is engaged with Nigeria in the ‘fight against corruption’ both in the oil and IT industries through deliberate integration of economic and foreign policy interests and policy actions.

Zimbabwe:

Zimbabwe is an example that is counter to the statistical findings of the study. In 2000 the software piracy rate was 59%, increasing to 68% in 2001 and reaching 71% in 2002. During the same period, the Transparency International Corruption Perception Index

¹³² The number ‘419’ reference to that section of the Criminal Code in Nigerian Law, which states that “Any person who by any false pretence, and with intent to defraud, obtains from any other person anything capable of being stolen, or induces any other person to deliver to any person anything capable of being stolen, is guilty of a felony ...”

receded from 3 to 2.7. This happened in a period during which Zimbabwe was confronting and resisting the very power structure that Nigeria was trying to appease.

“President Robert Mugabe has suggested the Internet, widely developed in Zimbabwe, is a tool of colonialists (Jackson 2004).” The president has recently introduced a Security of Communications Bill to control the Internet and telephones. In the event of an investigation, internet service providers (ISPs) would be forced to provide police with details of users who are creating content deemed as anti-national activity. “The proposed contract addendum, quietly distributed in mid-May [2004], also refers to the contravention of non-existent ‘international cyber laws’ ... President Mugabe last year described the Internet as a tool used by ‘a few countries in quest of global dominance and hegemony’ (Jackson 2004).” After South Africa, Zimbabwe is one of the continent’s most cyber-friendly countries, and yet Mugabe is intent on suppressing activists and government dissenters who have opted for online communications in light of strict government control over newspapers, radio and television.

In addition to a tightening of control on internet communications, the Mugabe administration is also regulating international NGOs that he perceives to be interfering with national politics. Mugabe refers to these organizations and their originating countries as a ‘mutant strain of imperialists who have arrogated to themselves the role of patrons of democracy and human rights, which they shamelessly trampled in pursuit of bloated self-interest (Muleya 2004).” Is this an example of a country refusing to submit to the western prescribed evaluation constructs of structural adjustments and multi-national trade agreements, or is it simply an example of a historical power structure shaped by previous colonization ... and resisting forward change within the globalization paradigm.

Tunisia:

Tunisia was the site of the second half of the World Summit on the Information Society (WSIS) in 2005.

With 300 government-operated cyber cafes and connectivity for all secondary schools and universities, Tunisia has a relatively advanced internet infrastructure. However, President Zine El Abidine Ben Ali’s government uses software programs and an army of technicians to prevent Tunisians from accessing certain websites dealing with human rights and freedom of expression. “In 2003 eight Internet users, seven of them aged between 17 and 22, were accused of promoting terrorist attacks on the sole basis of files they downloaded from the Internet. In July 2004 they were sentenced to 13 years in prison (Leahy 2004).”

Similar to the situation in Zimbabwe, the Tunisian government heavily regulates NGOs, and, in fact, there are very few that are not government affiliated. However, a May 2004 state visit by Ben Ali to the US offers a point of contrast between Tunisia’s relations with the west and those of Zimbabwe. In addition to hosting the World Summit on the Information Society (WSIS), Tunisia is seen to be a strategic ally in the ‘war on terror’

and, more generally, the clash between western and Arab states. Tunisia's suppression of human rights and other negative 'good governance' indicators, therefore, receives very little criticism from western administrations.

There are three important conditions that exist in non-industrialized countries as evidenced by Nigeria, Zimbabwe and Tunisia. The immediately observable similarity among these countries is a legal one that results in the codification of citizen obstacles to IT access – and thus information asymmetry – based on national security as well as the priorities of international business. Nigeria and Zimbabwe are both introducing bills that seek to monitor Internet communications, and both Zimbabwe and Tunisia have laws that suppress NGO and civil society activities.

The second condition is a vibrant youth culture in each of the three countries and their urban centers with demographic members mediated by exposure to international popular culture. This subset of the population sees information technology as a vehicle for individual mobility and identity articulation. Giddens (1991) asserts that everyone in modern society has to select a lifestyle, although different groups will have different possibilities (wealth increases the range of options). The choices which we make in modern society may be affected by the weight of tradition on one hand, and a sense of relative freedom on the other. He points out the importance of media in propagating many modern lifestyles, possibly offering more options than we would run into otherwise. This leads to the issue of self-identity, which is not a set of traits or observable characteristics, but rather a person's own reflexive understanding of their biography. Therefore the aforementioned detention of Tunisian youth cyber-activists, in the name of anti-terrorism, may well stunt the growth of Tunisia's youth culture rather than its stated justification to increase security.

Castells underscores this condition by reminding us of the population trends reality, that "the bulk of new [IT] users will certainly come from developing countries, simply because it is where over 80% of the population of the world live." He explains that the diffusion of the Internet occurs in three ways – within educated population groups; in key urban centers; and simultaneously with certain globalized activities such as trade, entertainment and education.

In Nigeria, 43% of the population is youth between the ages of 15 and 26. In this country one only has to observe the home video industry and its use of digital technology to understand implications for the software industry. This new knowledge economy manifests itself locally with the advent of software factories and related industries – home video industry, money transfer services, etc. – that employ young, business savvy Nigerians with rapidly developing technical competencies. The prevalence of indigenous software production in Nigeria, Zimbabwe and Tunisia, as they represent other countries in the study, is the third condition considered alongside corruption perceptions and software piracy. When this indigenous production is sanctioned from the world market and labeled piracy or corruption should its products reach that market, the actual effect is an increase in debts and payments for foreign exchange by countries, such as Nigeria, that are inevitably software consumer nations. A departure from the trend of spending

millions of dollars on software products from Europe, North America and Asia, a recent survey reveals that close to 70% of software currently in use in Nigeria is indigenous. However, the Nigerian government has yet to use its substantial petroleum influence in the international marketplace to lobby for an indigenous software production and export imperative, even as some suggest its adoption as the most logical strategy for leapfrogging obstacles to sustainable development and creation of wealth (Uwaje).

In an earlier passage, President Robert Mugabe of Zimbabwe refers to certain 'international cyber laws' and is likely referring to the very policies and sanctions such as structural adjustment and trade agreements imposed by the business community that hinder indigenous software industries and thus perpetuate outward perceptions of corruption. Here it becomes necessary to observe how replication has happened historically under local intellectual property regimes as they differ from western and international models in order to designate a practice as corrupt. A future factor will be how the World Intellectual Properties Organization (WIPO) will operationalize its decision to foreground development and the promotion of creativity, and whether this policy shift will reflect local, historical practice.

Non-existent International Cyber Laws?

So, what are these laws that Mugabe refers to? Is it the understandable difference between *de jure* and *de facto* practice that produces similar effects in multiple localities or are there observable elements that taken together comprise a formalized, international system? If this system exists, do countries such as Nigeria with its US Bilateral Non-Surrender Agreement and Tunisia as it positions itself as an outpost on 'the war against terror' seek to join as their citizens simultaneously resist through individual activist and commercial activity? And, conversely, do Mugabe's statements against the system reflect the point of view of Zimbabwean citizens on exclusion from such an globalized system?

The phrase 'digital divide' is often associated with differing hardware capacities between the north and south; however, it is also the inequality of access to information (sometimes due to language alone) that is available on the internet that maintains this divide. A 1999 UNDP report states that "the typical internet user worldwide is male, under 35 years old, with a university education and high income, urban based and English speaking." And statistics from the World Summit on the Information Society (WSIS) show that the digital divide is one of technology as well as content with more than 69% of web sites published in English.

The fact that the rise of the internet took place in conditions of social inequality in access everywhere may have lasting consequences on the structure and content of the medium. This is because users shape the internet to an even greater extent than any other technology because of the speed of transmission of their feedback, and the

flexibility of the technology ... [therefore] as the technology of access becomes more complex with more sophisticated technologies, it may slow down the rate of adoption among less-educated groups (Castells).

The author of 'Protocol: How Control Exists After Decentralization', Alexander Galloway, holds the view that "the Net's non-hierarchy should not be mistaken for uninhibited freedom. Rather control exists within the very nature of the Internet protocols, the universally recognized technical standards and shared languages (http, TCP/IP, HTML) that allow information to be shared successfully." He warns against treating this control and organization metaphorically, especially as these functions are actually being created and lived everyday by computer and Internet savvy consumers, thus exhibiting the power held by the initial users of such technology (Halter 2004).

The Internet Corporation for Assigned Names and Numbers (ICANN) is a global non-profit organization that was established in October of 1998 under the auspices of the US Department of Commerce (DoC). ICANN assumes the responsibility for coordinating the Internet's root server system, generic and country code top-level domain (TLD) name system management and IP (Internet Protocol) address space allocation. The public face of ICANN promises to interact with regional governments to identify outreach efforts, provide support for the establishment of regional Internet address registries, such as AfricNIC, and facilitate local input from representative advisory committees and constituents, and to eventually become completely independent of the Department of Commerce (Ikhemuemhe 2004).

There is an increased dependence of the Nigerian public and private sector operations on the Internet. And whereas Nigeria prides itself as a contender for control and administration of the Internet in the African region, it has failed to position itself for leadership in relevant bodies such as ICANN (Ikhemuemhe 2004). This may be the result of information asymmetry propagated by the ICANN western-led hierarchy itself through maintenance of its intricate organizational framework.

Under the 'reformed' ICANN those Internet users who wish to participate have to first join an ICANN-approved club. That club must, in turn, join a second ICANN-approved club. And that club, in turn, gets to send a few representatives to yet a third level of ICANN-approved club. And that third club, in turn, gets to send a couple of representatives to a pre-stuffed ICANN committee that, in turn, gets to name only a portion of the ICANN board of directors who, in turn, usually rubber-stamp what is put before them by ICANN's 'staff' (Karl Auerbach email on APC Article & ICANN, 2004).

The issues of equity and legitimacy are faced by ICANN administration. Around the world countries in the global south are experiencing invasive levels of control over the resources and functions essential for the operation of the Internet. How can a western-based organization strongly affiliated with US economic governance represent the interests of other nations? Developing countries end up paying foreign domain registry companies for the rights to register and operate their national domains (Mutume 2004).

Another perspective is that national domains should be a country's property and that international law should prevent companies and nationals of other countries from holding these virtual commodities. In following, failure of international lawmaking bodies to address this issue pertaining to vast present and future virtual resources perpetuates existing inequalities and results in a western-authored definition of corruption on which the actions of these bodies are then based.

While accountability, transparency and good governance programs insist that informal sectors be formalized in the countries for which they are tailored – and represent line items of new unilateral funding mechanisms such as for the US Millennium Challenge Account – their application may well tighten the already short-term decision-making cycles that constrain many countries in the global south.

And while anti-corruption can be easily added to the list of prescriptions, the propensity for donor countries and their indices-makers to confuse informality with corruption is not negligible. This de facto practice serves to reify the vast inequalities that currently exist across the global economy.

In practice, economists merely accept the existing distribution of wealth without question. But only rarely do they have the candor to admit that accepting the existing distribution of wealth implies accepting the existing system of law and moral rules (including the laws of private property). More generally, it implies the acceptance of the entire system of social power, all roles of super-ordination and subordination, as well as the institutions and instruments of coercion through which power is assured and perpetuated. Thus, most of the important issues with which radical economists are concerned are eliminated from the orthodox economists' analysis with the initial assumption of the Paretian [zero sum game] approach (Hunt, 27).

Perhaps the 'Non-existent International Cyber Laws' that Mugabe refers to, while lending organizational cohesiveness and structure to the industry, are comprised of hierarchical properties of virtual commodities/networks (software/Internet) as well as dominant industrial states positioning themselves to maintain competitive advantage in the IT sector.

Software as Proxy

It should also be stated that in a new industry sector such as software, the agency of the international business community is strong in terms of trade agreements. To date, these agreements have cultivated the common condition of software piracy as an exogenous indicator for IT-sector corruption, but one of the few forms of resistance in the face of a lacking IT hardware infrastructure and legal frameworks for indigenous software production.

Looking closer at Nigeria, its continuum of technology over two decades has experienced both a boom of informal video production as well as the country's reputation as a software piracy hub for Africa. In situations of high population density such as the Nigerian state, a perceived glass ceiling on formal advancement in the IT sector has

caused ripple effects throughout the region regarding ICT practice – video production, mobile telephony practice, indigenous software, etc.

A Relation between IT Access and the cycle of Information Isolation

A report entitled ‘Doing Business in 2005: Poor Nations Struggle to Reduce Red Tape for Business, Miss Large Growth Opportunities’ considers 145 nations and finds that it is two times harder in poor nations ‘for entrepreneurs to start, operate, or close a business’ in terms of administrative procedures. This relates historically to lacking and inexistent physical property rights protections available to poor nations, a precedent that extends to intellectual property rights as they pertain to software.

Chambers (1983) explains how the inter-connectivity of isolation, poverty, physical weakness, vulnerability and powerlessness creates what is known as the *deprivation trap* in localities and regions for which the flow of information is blocked.

Isolation (lack of education, remoteness, being out of contact) sustains poverty; services do not reach those who are remote; illiterates cannot read information of economic value and find it difficult to obtain loans. It relates to poverty through the sale or mortgage of productive assets; to physical weakness because to handle contingencies, time and energy have to be substituted for money; to isolation through withdrawal -- whether spatial (to a more distant marginal area) or social (to fewer reciprocal relationships) -- following shocks and contingencies; and to powerlessness through the dependence on patrons to which it gives rise (Chambers 1983, 112-113).

Chambers defines *soft spots* as "points in networks where alterations are likely to have more profound effects on a system than others. If one is trying to alter a system which has some in-built buffering, one of the most important first steps is to try to locate these *soft spots* (Chambers 1983, 157)." In order to affect change in historic systems of influence and power, networks must be analyzed and *soft spots* pinpointed. This involves the individual and market testing – and challenging – the sensitivity of the various links that comprise the network in question, in this case international commercial actors that use access to information to sustain their market advantages. However, the sensitivity of a particular link fluctuates depending on the current state of the entire network. "Notwithstanding the primacy of livelihoods, the points of intervention in trying to change the web of deprivation will by no means always be the same (Chambers 1983, 157)." For example, software piracy – or the unsanctioned creation and use of software – will perhaps diminish when intellectual property rights regimes adapt to the differing needs of states outside the west and indigenous software industries are allowed to create and trade their wares in the international marketplace.

Nair and Kuppusamy (2004) suggest five policy initiatives for developing countries that address uneven technological access and growth in information, communication and technology (ICT) infrastructure to promote human resource development, market competitiveness and innovation generally. Developing countries need:

- (1) To have a stable political environment and appropriate and dynamic economic policies;
- (2) To continuously create basic and advanced infrastructure to support ICT diffusion in the economy;
- (3) To focus on developing the skills and knowledge of the human capital in tandem with dynamic evolution of the information economy
- (4) To focus on inculcating innovation at the micro (worker) and macro (industry) level;
- (5) To create greater linkages between government, industry and universities in enhancing the quality of the infrastructure, human capital and innovation in the country (Nair and Kuppusamy).

Conclusions

In the era of globalization, we also see a trend towards unilateral and bilateral democratization initiatives among states. Democratization is seen as the antithesis of corruption. These initiatives are characterized by transparency, accountability, good governance and anti-corruption norms that hold tremendous sway in determining trade relations, memoranda of understanding and protocols of good standing, yet rarely account for differences in cultural heritage and technology access rates¹³³.

At the same time, some commodities – such as carbon on the ecological side and software on the technological side – have become virtual and can thus be traded, exchanged and pirated virtually, without a base, thereby subverting the commonly accepted paradigm for means of production. In essence, these virtual commodities become a proxy for global flows (Appadurai) and second economies more broadly. Youth in the global south participate in the 2nd economy or informal sector because these markets are the most accessible economic systems from the vantage of those operating in short-term decision-making cycles.

Contemporary youth are growing up in a rapidly changing and unpredictable world characterized by, among other things, a volatile global economy and fragile ecology; geo-political instability and the threat of war and terrorism; rapid technological innovation and obsolescence; new social formations, fundamentalisms and widening inequalities; changing understandings of civic and global responsibility; and a global cultural economy increasingly predicated on consumption ... At the same time as global consumer culture integrates and connects, it also segregates, differentiates and insulates young people from others – locally and globally and also selectively reveals and conceals its processes of production and consumption (Kenway and Bullen).

¹³³ The sources used by the TI Corruption Perception Index draw from a range of definitions for corruption that is characterized by the misuse of public power for private benefit, i.e. bribing of public officials; kickbacks in public procurement; general embezzlement of public funds; and undocumented extra payments connected with import/export permits, public utilities and contracts, business licenses, tax payments, loan applications, influencing of laws and policies, and getting favorable judicial decisions.

The example of India

Use of consumer audiovisual technology in Nigeria over the last two decades has grown into a formidable video production industry, one that is often likened to the history Indian cinema by tracing a common thread of audience subscription and industry growth based on population and language density in these two countries.

Similarly, the potential as well as obstacles for Nigeria's software industry are informed by the Indian experience. The various functions that comprise software engineering are not necessarily performed by employees of the same firm and can be carried out at different locations with relative efficiency. India has experienced rapid growth in export-oriented software. Despite the prevalence of maintenance activities over product development, its products have the potential to create direct competition to those of western countries in these countries. India has understood firsthand how growth in the IT sector can attract skilled engineers away from other sectors. This trend suggests that – despite the capacity of distance software engineering and open source collaboration – the international division of labor in software will evolve toward the integration of workers, firms, and locations. This reality would shift the 'soft spot' or entry point for software production and, in essence, emulate western industry's characteristic hierarchy. "Not only could this hamper the growth of a software industry, such a growth may even increase inequality by greatly increasing demand for the small segment of the population of the highly skilled and educated, and leave virtually untouched the rest (Arora and Gambardella)."

In closing, this essay encourages the reader to understand a need for new laborers to experiment with ways to improve information exchange and technological access, while not underestimating the probability of corrupt practice in thriving commercial sectors, especially emerging ones. Therefore, corruption perception and piracy in the software sector remain observable for joint analysis yet de-linked to avoid confounding results. Justification for revisiting relativist definitions of corruption for this look at the software sector is succinctly addressed by this excerpt from A Hacker Manifesto – "[Whereas] the privatisation of information becomes the dominant aspect of commodified life, information as property may be shared without diminishing anything but its scarcity (Wark 2004)."

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2.6 Internet Governance

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Kafui Amenu Prebbie is currently the Administrator of the ICT Center, University of Education, Ghana and the Country Director of oneVillage Foundation-Ghana. He is candidate of a UNESCO sponsored Master of Education specializing in Information and Communication Technologies in Education (M.Ed. ICT) and currently working on Course Management Systems and Development of Educational Software for schools.

With deep interest in bridging the digital divide, he sees continental youth development efforts as a key component to any ICT for Development (ICT4D) efforts. While at the University of Education, Winneba (UEW), he became the President of the Apple Computer Club -a student ICT4D club- and Vice President of the Optical Society of America (OSA) student chapter -which advanced the science of light in communications. He took the opportunity to put to practice his thoughts on bridging the digital divide. Alongside, he took keen interest in his academic work at the University where graduated with a degree in Mathematics and a minor in Physics and Educational Psychology; winning an Academic Merit Award in 2001.

Kafui earlier graduated from a three-year course leading to a Professional Teaching Certificate by the University of Cape Coast in Ghana and his work earned him the Best Science Teacher in his district in 1999, the youngest in the history of the award.

Since his award as Ghana's ICT Youth Ambassador (2001) to the International Telecommunication Union (ITU) Telecom Africa 2001 in South Africa, he has supported various efforts locally, continentally and internationally including the World Summit on the Information Society (WSIS) process. Building on that momentum, he co-founded the African Youth Initiative project and designed the CatchITYoung –ICT4D Clubs in Pre-tertiary Schools- project as legacy for the next generation.

With his great organizational skills, Kafui designed and implemented the Sports People That Care project for oneVillage Foundation; a project that provides support for people living HIV/AIDS and children orphaned by AIDS.

Kafui professional objective is to develop appropriate Computer Based Instructional Delivery (CBID) Mechanisms and Online Educational Content Development (OECD) strategies and tools for education in developing societies.

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Jeff Buderer received his Political Science degree in 1998. He then embarked on a three-year stint at Arcosanti, a unique live/work experiment in architecture and urban design located in the desert of Arizona near Phoenix. While at Arcosanti, he enrolled in an ecological design course organized by Ecosa Institute which has included some of the leaders of ecological design movement including Pliny Fisk, Hunter Lovins, David Orr, Antoine Predock, Paolo Soleri, Michael Sorkin, Dr. John Todd, Sim Van Der Ryn, Mathis Wackernagel and James Wines. The capstone of the course included the writing of a manifesto on the role of ecological design in transforming architecture and even more fundamentally human reality. Over the last two years he has been exploring the practical role of information technologies in facilitating the rapid growth of sustainable built environments globally as Program Development Manager for oneVillage Foundation. While at OVF he worked with UNESCO and the Club of Rome to present an event in Africa. Most recently, he has been involved as a member of the lead team in the development of preliminary planning for Califia, which is envisioned as a 10,000 person model eco-city type development for the San Francisco Bay Area that is designed to be an evolution of Paolo Soleri's urban Arcologies as well as incorporating leading edge ecological design and sustainable development concepts.

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Olaposi Olakunmi Isaiah Abiola is a Nigerian from the Southwestern part of the country. His academic background is in Electrical Electronics Engineering and Computer Science and Engineering. In college, he founded Global Resource Information Technology Network (GRITEN) which sought to serve people from different fields with the vision of using Information and Communication Technology (ICT) as enabling access to information, both regionally and internationally within individual organizations and Management Corporations through a Global Network System. In 2003, he became Country Director of OVF Nigeria. In 2005 he undertook ICT training to become a certified trainer in Kabissa's Time to get Online Program. Most recently, he worked as OVF's Nigerian program coordinator, spearheading a venture that aspires to manufacture and sell Micro Solar panels in developing countries as Do It Yourself Solar Systems. DIY Solar provides a low cost, more ecologically friendly alternative to dry cell batteries, which many people rely on in regions of the country without grid electricity.

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Mark Roest received a B.A. in Liberal Arts, and did graduate studies in Urban & Regional Planning, at San Jose State University. Mark's focus is on the components of, and systematic steps toward building sustainable economies, especially in the rural areas of developing countries. In 1974 he did a thesis on the Commercial Feasibility of Wind

Energy in Solano County, including wind resource analysis, turbine design identification, and a cost and revenue analysis. Mark also has done research related to the development advanced structural systems that can dramatically reduce construction costs.

In 2003, after joining oneVillage Foundation, he played a key role in securing funding for an educational program focused on nutrition and health and open learning program called Grassroots Underpinnings: Poverty, Nutrition, ODL/ICTs and Women (GRASSUP NOW). He was part of a team that considered OpenVista - an open source hospital information management system that the U.S. Veterans Administration uses in its hospitals - for health care delivery and public health administration in the developing world. Mark has also contributed to various grant proposals including: one promoting a Community Knowledge Delivery System; collaboration in distance learning and curriculum development; and small scale micro solar system for developing countries to power radios, cell phones and LED lights.

Internet Governance: Roles in Developing and Managing Effective ICT Systems to Address the Problematique

The Club of Rome first sounded the alarm about the current unsustainability of human civilization in the now classic book *Limits to Growth*¹³⁴. That was over 30 years ago and while not much has changed in developing effective solutions in terms of large scale global implementation of a more ecologically and socially sustainable model of economic development, ICT has grown tremendously in terms of its *potential* to address the scaling of sustainable systems, best practices and approaches globally. The *problematique*¹³⁵ is a term used by the Club of Rome (CoR) to depict the web-like nature and global scope of many challenging problems that cross national borders to become international issues. One of the goals here is to consider how the CoR methodology including the *problematique* can be used effectively to address the challenges of Internet Governance.

What is Internet Governance?

Here is the official textbook version put forward by the Working Group on Internet Governance (WGIG):

Internet governance is the development and application by Governments, the private sector and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programmes that shape the evolution and use of the Internet¹³⁶.

The Net Dialogue, a joint project between Harvard Law School's Berkman Center for Internet and Society (Berkman Center) and Stanford Law School's Center for Internet and Society (CIS) says that some “technology purists see the idea of Internet as referring simply to the core technology of TCP/IP that enables communications between endpoints.” To this group “what matters is the technology itself, and "governance" belongs in another realm. People in policymaking world, however use the term "Internet governance" to refer to governments setting and administering policy not just for the infrastructure of IP-based networks, but also for the activities that take place over these networks¹³⁷.

¹³⁴ Donella H. Meadows, Dennis I. Meadows, Jorgen Randers, William W. Behrens III. The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind (New York: Universe). 1972. [Abstract](#) compiled by Eduard Pestel.

¹³⁵ Overview of CoR's Problematique based [methodology](#). Also see CoR [PowerPoint Presentation](#) on the Problematique.

¹³⁶ [Report](#) of the Working Group on Internet Governance Château de Bossey. 06/05.

¹³⁷ Taken from the [FAQ](#) Section of the The clearinghouse on international Net governance is the website arm of Net Dialogue, a joint project between Harvard Law School's [Berkman Center for Internet and Society](#) (Berkman Center) and Stanford Law School's [Center for Internet and Society](#) (CIS).

We assert here in this chapter an extension of the above based on the assertion that issues of Internet Governance increasingly are merging with issues of how to effectively manage the real world. In addition we believe that key to the development of more a sustainable society is the development of effective and powerful Internet Governance (IG) tools. In our definition therefore, *IG describes the use of the Internet to make decisions relating not only to how the Internet is designed, developed and managed, but also increasingly in terms of how ICT is being used to manage and empower various aspects of the non-virtualized society.*

Larger Social and Economic Dynamics Driving the Rapid Growth of the Information Society

The Internet remains a highly dynamic medium. Therefore any framework designed to deal with Internet governance should be responsive to the exponential growth and rapid evolution of Internet seeing that it is not simply a reflection of itself but rather a response to the large human trends associated with the rapid changes in what it means to be human in the modern world. Dr. Francis Heylighen of the Free University of Brussels notes that “increasing instability, complexity and reach of causal networks...,” leads to “decreasing controllability and predictability.” As a result:

Individuals are forced to consider more information and opportunities than they can effectively process. This information overload is made worse by “data smog”- the proliferation of low quality information because of easy publication. It leads to anxiety, stress, alienation, and potentially dangerous errors of judgment. Moreover, it holds back overall economic productivity¹³⁸.

In response to this challenging component of the problematique, the internet as a common platform for the development of multiple applications has the potential to integrate the many aspects of human reality into a more cohesive approach to not just governance but global governance.

Tim Berner Lee’s vision of the *semantic web*¹³⁹ is still more vision than reality. Yet it has become obvious to many including the IT visionary technologist Dr. Engelbart, that the fate of humanity or at least modern civilization lies in the development of Internet based systems that can empower humans to effectively manage this exponential growth in the flow of information and overall human complexity.

Many activist groups like the Association for Progressive Communications view IG as a key tool for building more socially just and decentralized societies, by enhancing

¹³⁸ Francis Heylighen. “[Complexity and Information Overload in Society: why increasing efficiency leads to decreasing control](#).” 04/12/02.

¹³⁹ Andrew Updegrave. “[The Semantic Web: An Interview With Tim Berners-Lee](#).” Consortium Standards Bullitin. 06/05.

people's ability to effectively use ICT to empower themselves. This realization is based on the understanding that there is a connection among personal empowerment at the grassroots level, the addressing of world urgent issues, and the development of an effective system of using the internet to govern ourselves. Without powerful ICT augmentation tools to effectively manage the exponentially increasing information flows that enter our daily lives, the ability to effectively apply IG as a practical concept to promote a more democratic and socially just global society will be just another fleeting initiative of the global civil society movement.

The rise of complex modern human systems has mandated more automation and complex systems of managing information and or data and people – machine readable data on the web and so this is improving many information society logjams. Yet the idea of governance cannot be considered as simply an issue of technology or the management of information – but an organic process and evolutionary process involving multifaceted layering of human networks, and through those networks the effective discernment of relevant knowledge and management and organizational development processes. As Sir Arthur Clark notes we are now “faced with the responsibility of discernment,” and “...coming to understand that it is not the information itself that determines our future, only the use we can make of it¹⁴⁰.”

Doug Engelbart has made many contributions to throughput in information technology. Of course it was these innovations that made him highly regarded in Silicon Valley. Before Tim Berners-Lee invented the World Wide Web at CERN, Dr. Engelbart developed interface devices that make what we now call the Internet possible. His most famous invention was the mouse. However, he also developed and demonstrated various processes of presenting information from a distance via various computer interface tools¹⁴¹.

Yet despite all the accomplishments, for him, there is still something missing and that is what drives him in the promotion of his vision of an ICT augmented network which he refers to as a Networked Improvement Community (NIC)¹⁴². Dr Engelbart seems not so much concerned about IG per se as much as his desire to create network augmentation tools to enable globally linked groups of people to begin to think effectively on a collective level to begin to address world urgent issues. What is missing is not the right technology but rather the collective human Will to develop and manage “humanizing technologies” that increase the collective intelligence or what Dr Engelbart calls the *collective IQ* of humanity, through the creation of effective and cooperatively driven networking and knowledge sharing systems. This vision is very much in line with CoR's

¹⁴⁰ Nalaka Gunawardene. “[Humanity will survive information deluge – Sir Arthur C Clarke](#)” OneWorld South Asia. 12/0503.

¹⁴¹ Bill Joy. “[The Dream of a Lifetime: Doug Engelbart and augmenting human intellect.](#)” Technology Review. 08/05.

¹⁴² Douglas C. Engelbart. “[Facilitating the Evolution of our Collective IQ: What Universities and Professional Societies Can Do.](#)” ECOOP 2004 Conference Oslo, Norway, 06/14-18/04.

Mission Statement, which affirms the importance of realizing the potential, dreams and vision of every human being on the planet.

History

When Tim Berners-Lee began his research into and developed the World Wide Web in 1989, he envisioned it as free, reliable, exhaustive, and logically organized. An excerpt from Wikipedia, notes that:

“While the component ideas of the World Wide Web are still simple, Berners-Lee's insight was to combine them in a way which is still discovering its full potential. Perhaps his greatest single contribution, though, was to make his idea available freely, with no patent and no royalties due. The World Wide Web Consortium (W3C) – the forum for information, commerce, communication, and collective understanding which develops interoperable technologies (specifications, guidelines, software, and tools) to lead the Web to its full potential - decided that their standards must be based on royalty-free technology, so they can be easily adopted by anyone¹⁴³.

The Purely Economic Rationale of the Net verses ICT as a force for Good

The Internet is in many respects decentralised, self-regulating and most obviously has become increasingly driven by market forces. In contrast to the traditional telephone system; it is based on packet switching, and has developed outside that land based system's highly regulated structures. The Internet is based on the technical and commercial interactions between a myriad of internet service providers (ISPs), eCommerce portals and ads. Therefore Internet economics is like an ecosystem in which the behaviour of each network and node is shaped by the market forces of the interactions within the network. The opportunity for direct policy inputs is therefore much lower, and the most meaningful interventions are those with commercial relevance.

For example Google's recent move to voluntarily censor its site to comply with the Chinese government's desire to control and to purge the internet of what it deems undesirable elements, is a textbook case of profit trumping principle¹⁴⁴. This leads to fierce debates over the Internet's level of inclusiveness and its overall effectiveness in actually practically being used in a way that is consistent with the vision and ideals put forward by civil society groups such as those who were a driving force at the World Summit on the Information Society (WSIS).

¹⁴³ http://en.wikipedia.org/wiki/Tim_Berners-Lee#endnote_free

¹⁴⁴ BBC News, “[Google censors itself for China](#),” 01/27/06.

The global nature of the internet with its growth outside of the control of governments, and the present limits of international cooperation has meant that there is no single international internet governing body but rather an increasingly disperse and diverse collection of groups. The difficulties experienced in various attempts to govern the Internet parallels the trend in the real world towards increasing divergence away from the ideals of “global village” concept and many of its civil society institutions which are still in their infancy. This trend continues despite the tremendous effort and good intent of many influential global as well as local decision makers, opinion leaders and activists. The result is a prevailing deeply entrenched but often well hidden sense of futility, in developing these global initiatives.

When Tim Berners-Lee was asked whether he had mixed emotions about his role in making the Web an open system?, he replied, Not really. ItThe decision to make the Web an open system was necessary for it to be universal. You can't propose that something be a universal space and at the same time keep control of it”¹⁴⁵. Berners-Lee expressed the underlying challenge that we grapple with not just in relation to the internet but in terms of how humans develop the systems to collectively manage the development of global society of more than 6.5 billion people.

IG and Internet Infrastructure Development

As hinted at in the previous section, the global nature of the web greatly complicates effective governance. Transactions on the Internet can crisscross state and national borders without easy detection. Any legal regime that may be desirous to govern web activity must deal with issues of compliance and enforcement in order to be implemented effectively. This also means there is a greater need for cooperation between various branches of government and law enforcement in and between countries.

This task remains the responsibility of the government of each nation around the world, as all are now connected to the Internet to some degree. At present, more than a dozen intergovernmental organizations) are deciding rules for the networked world, many of which are gathered under the umbrella of the Internet Society, which oversees the complicated task of balancing competing interests in the evolution of new technical standards¹⁴⁶.

Professor Michael Rappa and others commonly divide IG into two broad groupings:

1. First addresses how the “Internet itself, a technologically complex global communication network, can be managed so it can continue to grow.” Several organizations, many which are gathered under the umbrella of the Internet Society, oversee the complicated task of balancing competing global interests in

¹⁴⁵ Wikipedia bio on [Tim Berners-Lee](#).

¹⁴⁶ <http://netdialogue.org/>

the evolution of new technical standards. The kinds of issues discussed include¹⁴⁷:

- a. Domain names: the rules guiding the creation and administration of top-level domain names (TLDs), such as ".com" or ".org", and country-specific TLDs, like ".au" (Australia);
 - b. Internet Protocol (IP) addresses: the allocation of unique IP numbers so that each machine connected to the network has its own numerical address;
 - c. Root nameservers: Management of the 13 root nameservers that resolve domain names into IP numbers and enable information to flow across the network;
 - d. Standardization: encouraging the adoption of technical standards to preserve interoperability across the network as technologies evolve.
2. The second major issue is how to legally govern activity conducted on the Internet. This task remains the responsibility of the government of each nation around the world that is connected to the Internet. The regulatory agenda covers a wide range of activities:
- a. Regulation of business transactions and securities trading; Consumer protection (including the protection of minors); Fairness in advertising;
 - b. Protection of intellectual property;
 - c. Various forms of taxation on the sale of goods and services; Prohibitions on gambling, the trafficking of alcohol and other controlled substances across borders;
 - d. Regulations on the safety of food and prescription drugs;
 - e. Protection of free speech and controls on the distribution of indecent materials.

These are just some of the areas in which the government has had a historical role¹⁴⁸.

The Battle for ICANN

For quite some time a global battle has been brewing over the Internet Corporation for Assigned Names and Numbers (ICANN). The governance issues revolving around ICANN, reflect a power struggle in regards to who will have control over the Internet. There has been much criticism of ICANN among many stakeholders of the *Internet Society*. Their concerns include:

1. ICANN's process for making decisions is anti-democratic and appears skewed in defense of vested and established group's interests and is not representative of the diverse Internet inhabitants¹⁴⁹;

¹⁴⁷ Michael Rappa. "Managing The Digital Enterprise" Taken from the section on [Internet Governance](#).

¹⁴⁸ <http://digitalenterprise.org/governance/gov.html>

2. ICANN is an example of a "rogue institution," which did not fit, nor plan on entering, into a simple form of international civil society¹⁵⁰.
3. ICANN exceeds the scope of authority and threatens to continue to extend its reach to issues over which it has no legitimate control.
4. Its adoption of the Registrar Accreditation Agreement, despite serious objections to the latter by many global stakeholders – has been attacked as secretive and anti-democratic;
5. Continued resistance on the part of US to give up its dominant control of ICANN.

The debate about administering the internet's technical architecture has been reframed as a question of political legitimacy. The calls for greater openness and for a more representative process have resonated with ever great force as people have begun to see the tremendous potential the internet has in providing information and access to people around the world.

In 1999 American consumer advocate Ralph Nader, and Jamie Love (on the behalf of the Consumer Project on Technology), wrote a letter to Esther Dyson, then Chairman of the ICANN Board of Directors. They expressed their concerns about control of ICANN by Network Solutions and other powerful US corporations, as they felt it failed to reflect not only the US public interest, but also the rapid expansion of the Internet into an international phenomenon¹⁵¹.

On June 30, 2005, the United States Department of Commerce National Telecommunications and Information Administration (NTIA) released the "US Statement of Principles on the Internet's Domain Name and Addressing System." In reaction to the US Statement, the Internet Governance Project (IGP) issued the following response to the NTIA's declaration in a Concept Paper on 28 July, 2005 titled *The Future US Role in Internet Governance: 7 Points in Response to the U.S. Commerce Dept.'s "Statement of Principles"* *stating that:*

1. US policy from the White Paper forward, has promoted internationalization of, and a leading role for non-state actors in, Domain Name System (DNS) governance.
2. The US Government's Current Role contradicts its own 1998 White Paper.
3. The US Position is Unclear
4. ICANN Does Need Oversight – But Oversight Powers must be Internationalized, Limited and Lawful.
5. If Interpreted as a Prospective Statement, the NTIA "Statement of Principles" Undermines the Viability and Legitimacy of ICANN.

¹⁴⁹ Gina Paik & P R Stark. "[The Debate Over Internet Governance: A Snapshot in the Year 2000.](#)" The Berkman Center for Internet and Society at Harvard Law School.

¹⁵⁰ Kim G. von Arx & Gregory R. Hagen, "[Sovereign Domains: A Declaration of Independence of ccTLDs from Foreign Control.](#)" Fall 2002.

¹⁵¹ <http://www.icann.org/nader-questions.htm>

6. Continued US Unilateralism in Internet Governance undermines the longterm stability of the Internet.
7. The US should take a leadership role in defining future a global governance framework

In the second paragraph of item numbered 6, it was mentioned that;

“Continued US unilateral control of the Internet’s domain name space does not increase the security of the Internet. On the contrary. If oversight of the DNS is seen as a US strategic asset rather than as a globally shared infrastructure, the risks of deliberate disruption and politicization of the Internet’s central coordinating operations can only increase. Politicization brings with it a growing risk of fragmentation of the Internet into national and linguistic blocs insulated from US participation. Aggressive assertions of US control only increases the possibility that other nations will support policies that will deglobalize and territorialize authority over the Internet. Moreover, it is important to get the cooperation and buy-in of developing countries such as China, Brazil and India now, before they choose to go their own way according to principles and norms or technical standards that may or may not be acceptable to the US or to other Internet users”¹⁵².

The fundamental conflict between dissent and power regarding the control of DNS and ICANN is still being played out on the Internet. This struggle has implications that go far beyond Internet Governance. Kenneth Neil Cukier writing in *Foreign Affairs Magazine* (US) says, the United States recently disclosed plans to retain control of the Internet indefinitely and basically intends it to be “a sort of Monroe Doctrine for our times.” The US governments stands on ICANN is very consistent with the increasing tilt towards *unilateral exceptionalism* that has been the hallmark of American foreign policy in recent years¹⁵³. Cukier notes, that “It was received abroad with just the anger one would expect, setting the stage for further controversy¹⁵⁴,” adding fuel to the potentially incendiary foreign perception of the US as a global superpower makes up the rules as it goes along to suit its interests

Duke University’s Duke law & Technology Review argues in its 2003 paper on” ICANN - Now And Then: ICANN's Reform And Its Problems” that there is a need to global Internet stakeholders to declare independence from a one-entity controlled DNS (ICANN). They suggest sharing authority over the *root* “by acknowledging that countries accountable to their populations...,” in real world affairs should also be the primary force in setting DNS policies. The next step once “technical and political independence has been achieved” is to design an international body to manage the DNS¹⁵⁵.

¹⁵² Internet Governance Project “[The Future US Role in Internet Governance: 7 Points in Response to the US Commerce Department’s ‘Statement of Principles’](#)” 07/28/05

¹⁵³ David P. Forsythe, “[U.S. Foreign Policy and Human rights in an Era of Insecurity: The Bush Administration and Human Rights after 9/11,](#)” 05/30/03.

¹⁵⁴ Kenneth Neil Cukier “[Who Will Control the Internet?](#)” *Foreign Affairs*, 11-12/ 05

¹⁵⁵ 2003 Duke L. & Tech. Rev. 0007. “[Icann - Now And Then: Icann's Reform And Its Problems.](#)” 4/11/03

However with the above solution, primacy is still given to the nation-state in these proposed reforms of the root structure of the DNS. Some go even further see the evolution of the Internet itself as a inherently organic and “distributed” systems that will empower a decentralization process that will further drive current trends of globalization that are rendering the nation state as obsolete as an effective political, economic and social entity. Inherent in the net are tendencies that promote decentralization, that have the potential to change the very dynamics of modern organizational structures and networks and making top-down organizational systems obsolete.

As the internet becomes more influential in the emerging global society, many expect that existing top down approaches will be further challenged. A case in point: the term open source refers to a movement of coders who have challenged the top-down and monopolistic business approach offered by some companies.

Importance of Transparency, Accountability in Internet Governance

The Internet has great potential to promote transparency and more open governance even when the dominant political power does not want such reforms. In Belarus, Tunisia, China and Iran, increasingly clever and web savvy people have circumvented coercive governments, using the internet to express themselves and to organize resistance against the repressive governments.

In relation to the second aspect of governance discussed previously, Miguel J. Schloss, who is Managing Partner, DamConsult Ltd., Santiago, Chile, says that “The paradigm shift generated by globalization has severely tested governance practices throughout the globe.” The reasons below explain the loss of national power and as Schloss says, leads to the “Diminishing relevance of the nation-state...”:

- Difficulties of the highly centralized nation-state to adjust to rapidly changing conditions such as the “increased mobility of goods, services, funds and people across borders;”
- Development of new decentralized distribution and governance systems such as the Internet;
- Rise of global commerce and free trade and through that the multi-national corporation;
- Privatization and increased deregulation of national markets while continued minimal regulation of international markets.

Schoss notes that there is a “...multitude of international conventions, principles, standards and pacts to combat various dysfunctions, including corruption, have been developed by institutions that are too inflexible to deal with a highly dynamic, agile and creative world.” Namely we can see that the poor reputation of the UN as well as much of the international development community is to some extent justified based on their track record of having not been able to find solutions to work urgent issues.

A substantial amount of money has been spent to address issues of global development and governance and yet it is not clear that this money has been well spent. If IG is to be a true alternative to the above mentioned dysfunctional and ineffective global governance patterns then we need to take what Schoss says to heart. He says, "A better understanding of governance dysfunction and corruption is essential if we are to address the root causes of the problems, including their economic, political, and institutional dimensions.

Furthermore in designing effective IG systems we need to see the increasing overlapping tendency of real and virtual realities. Not only exploring the role of IG towards a process of governing the net, but also seeing its role in guiding the Internet to address the fact that corruption and societal dysfunction in the bricks and mortar tends to be correlated with¹⁵⁶:

1. Weakness in the rule of law that governmental institutions are supposed to uphold;
2. Lack of strong civil society institutions;
3. Societies that are less pluralistic and which are led by dominant groups and tribes leading to tribal and ethnic conflicts;
4. A resistance to transparency and accountability among the leadership classes in fully explaining their policies and use of monies to the general public;
5. Lower percentages of professionals in the population as well as professionals that are not accountable and relevant to the authentic needs of the lay people/general public.

In November 2005, UN Secretary General Kofi Annan and Tunisian President Zine el-Abidine Ben Ali opened the World Summit on the Information Society (WSIS). The summit focused primarily on the twin issues of financing of ICT for development (ICT4D) efforts in developing countries and IG since the first summit was held in Geneva in December 2003. Tunisia was the site of the 2005 WSIS and this was not without controversy as many local democracy advocates were outraged.

In the hallways of the official government meetings, government officials are arguing adamantly about the governance of the Internet -- a central battle is around whether a new international association will be created to control high level domain names, and essentially take over the responsibilities that have been handled by ICANN. Although it may sound like a battle over trivia, it is really a power struggle. At its heart is a key question: will people be able to communicate freely with one another or will governments control Internet access and communications. The US and some others argue that we don't need yet another international, government-based bureaucracy to take on this role, and that type of bureaucracy will inevitably get bogged down in red tape and be unable to be responsive to a phenomenon as dynamic as the Internet. Some other governments, in the Middle East and some developing countries, want an international UN-related organization in this role. As the countries arguing most strongly for the

¹⁵⁶ <http://topics.developmentgateway.org/governance/highlights/showMore.do>

international governing organization are also some of the most repressive regarding free communications, the whole idea gives one pause.

The Second WSIS event exposed several challenges for Internet Governance. Panos London's Murali Shanmugavelan argues that building an inclusive information society will need civil society to hold governments to account - and that the media has a crucial role to play in ensuring this happens¹⁵⁷.

Dr. Richard Heeks however in his "sixth eDevelopment Briefing - "Is the Communication/ Rights Agenda Damaging eDevelopment?" expresses concerns about how *Communications Rights* activists, "may damage e-development," if they put forward initiatives that appear "old and implausible," and if they exclude "two key roles for ICTs in development: data processing, and IT sector enterprises¹⁵⁸." With consideration to those concerns, we need to ask what the role of the Internet and IG in promoting and ensuring global justice, governmental accountability and transparency rather than being used by repressive governments to obfuscate and distort the truth?

The Third Rung of Internet Governance: Supporting Effective and Empowered Knowledge Societies Globally

Technologies have had a critical role in driving ecological and human systems to the brink of failure, so it is important to understand the role of technology in the organization of societies. Pip Coburn of Coburn Ventures notes that the Internet sector is struggling with the distinction between the wise and effective use of knowledge, and the prodigious production of information, content and throughput. Previously, success was determined by how much information you could process in your system – throughput. Indeed, all measures of modern success still revolve around this concept, and this is of course the root cause of unsustainability of modern systems, which can be explained with a simple meme like statement – the more we produce the better we will be.

What Pip Coburn former tech strategist of UBS Warburg and now Principle of Coburn Ventures has often emphasized in his writing is the realization that there is a growing sense of need to integrate all the products, technologies and information that we have created into holistic systems designed to maximize human potential and well being.

Doing this requires integrated knowledge of:

1. How to organize information and knowledge so they are usable;
2. How to organize Information and Communication Technology (ICT) systems so they are effective;
3. How holistic systems that combine nature and artifact function
4. The elements and relationships of positive (and negative) holistic systems in the world;

¹⁵⁷ <http://www.panos.org.uk/iwitness/summit/shanmugavelan.asp>

¹⁵⁸ <http://www.sed.manchester.ac.uk/idpm/publications/wp/di/short/DIGBriefing6Agenda.doc>

5. How to orchestrate the management of these elements and relationships so that the systems actually do maximize human potential and well being.

The successful integration of all this knowledge will require many (maybe most or all) people to contribute data, theories, models and simulations, and all of the support that is necessary to sustain such an effort. [For many people, this will be a highly fulfilling process.] The distributed nature of the Internet makes it a potentially viable medium for collecting, storing, moving and arranging information and knowledge with the required scale, complexity and accuracy. But for it to realize this potential, at least a portion of it must be organized and governed effectively and efficiently in service of that goal. Let us examine some steps in this direction.

Role of Open Source Approaches in Expanding the Scope and Impact of Governance

The APDIP e-Note 5 touches on “Building Online Communities of Practice: The International Open Source Network Model” and describes how one Community of Practice (CoP), the International Open Source Network (IOSN) is building a participatory, sustainable and ever-expanding CoP in an online environment. According to the IOSN the strategic use of free/open source software (FOSS) solutions for integrated governance solutions¹⁵⁹:

1. Promotes sustainable human development using electronic mailing lists and really simple syndication (RSS) feeds
2. Encourages members to participate in the community through blogs, forums, polls and wikis
3. Develops a culture of sharing among members.

Considering Convergence in the Development of Effective IG Solutions

The term *Convergence* is commonly used to refer to multiple functions being brought together in one electronic device (or in a smaller number of devices than previously). It can also be applied to the convergence of ideas in the collective consciousness to become a movement or a subculture, and to the development of interdisciplinary studies in the social, economic, physical and natural sciences.

The development of effective ICT solutions places demands on various components and layers of IG. For example, consider how the following terminology applies to an effective development approach that addresses world urgent issues.

1. What is a community?
2. What is a best practice?
3. What is an application layer?
4. What are knowledge, wisdom and information?

¹⁵⁹ <http://www.apdip.net/apdipenote/5.pdf>

These terms can help us bring together a broad variety of disciplines and specific fields of study, by shedding light on what is relevant to the fundamental needs of society and nature.

In studying the development of the Internet some stress the importance of knowledge versus information societies. A UNESCO report takes stock of the difference¹⁶⁰. We need a system to manage our increasingly complex world in an effective way. The major advantage of IG is that it has the potential to let us use the Internet as part of such a system. . The UNESCO report suggests that the starting point is to expand quality education for all, “increase community access to information and communication technology, and improve cross-border scientific knowledge-sharing, in an effort to narrow the digital and "knowledge" divides between the North and South and move towards a "smart" form of sustainable human development.” According to the report Knowledge societies contribute to the well-being of individuals and communities, and encompass social, ethical and political dimensions. Information societies, on the other hand, are based on technological breakthroughs that risk providing little more than "a mass of indistinct data" for those who don't have the skills to benefit from it.

The Role of “Storytelling” in the Development of Empowered Communities that Can Effectively Govern Themselves

In a chapter on a still yet to publish book on storytelling, Michael Margulis of the Washington DC based Thirsty Fish discusses the oneVillage Foundation (OVF) storytelling process which has been used by OVF Founder Joy Tang. The process centers on what Joy refers to as "Radiant Listening". This term was used in relation to person-to-person contact. We might also consider the importance of an effective communication process that builds trust among the participants, in relation to the role of IG in the development of more transparent and accountable political and economic governance structures. Storytelling can be part of a confidence- and trust-building process among the communities that will participate in any IG body. In addition any governance process must affirm each group and participant’s story in order to succeed. Otherwise, people will develop a distrust of the process, as they will feel dehumanized and neglected.

Another consideration and prerequisite of IG is overall system readiness. Taking the integration model introduced at the beginning of this paper, some say it is questionable to push for a serious IG effort in developing regions when the overall readiness is not there. The Association for Progressive Communications notes that while many promises are made in press releases and papers at countless conferences, the progression “to the promised global village, the information superhighway is plagued by poor access and high fares that the bulk of this planet simply cannot afford. Reducing international internet costs is an important priority...¹⁶¹”

¹⁶⁰ <http://unesdoc.unesco.org/images/0014/001418/141843e.pdf>

¹⁶¹ <http://www.apc.org/english/wsis/blog/index.shtml?x=2427753>

The fact remains that so long as the issues that divide digital access so starkly between haves and have-nots globally are not resolved, IG will be seriously hampered in empowering people in developing regions to truly govern and manage their own affairs.

Of course another opportunity of IG is more direct forms of governance. Most simply understood, this is the ability to vote on governance issues electronically through the net. However, a deeper concern is that the complexity of our society mandates that we replace a simple 'yes-no' with a variety of options for discussion of how to deal with a complex issue.

This includes new models for how political conventions are organized, and how to use the Internet to bring education, job training and health care to everyone on the planet. The Forum Foundation suggests that conventions be “designed for teaching and debate on a variety of options, with electronic connections to neighborhoods all over the country to encourage more such sophisticated debate also.” Giving an example, the foundation notes that:

“...The issue is not whether to have health care or not, but how...and this means studying a variety of possibilities by connecting, for example, to people in other countries to get their experience with one option or another. Too much politics is top-down rather than encouraging debate and participation from the bottom-up which gives power to the people.”

Internet Governance and Africa

In the discussion of IG and Africa we must consider the impact of the Digital Divide in making the expectation of computer use unrealistic for most Africans. The Internet's development in relation to Africa, and the development of management and coordination systems between online networks, needs to be seriously considered. The continued stifling of the net in Africa reduces the potential of IG to foster the development of effective economic, educational, agricultural and health care practices that might involve a significant cross-section of society.

The Net has the potential to profoundly alter the development and administrative process. However, in the development of such a novel and radical program, it would be recommended to start with experimental telecenters that, beyond simply providing computers, provide an experience of total immersion in an integrated approach to sustainable development, as outlined [touched on?] in the previous paragraphs.

IG and Support for Effective Conferences on ICT

One thing Africa has not lacked in the last few years is conferences on ICT in which a wealth of policies, positions and pontifications have been put forward, and that is a cause for optimism. However, also notable is that travel is a technology intensive process, thus

more travel intensive events mean logically that Africa is spending a disproportionate amount of money on travel for conferences. Therefore it is particularly important to ensure that Africa's return on its conference expenditures is having an impact on the grassroots.

What is the role of IG in relation to maximizing the potential of these conferences? Some thought has been given to this. Conference organizing, for example, involves considering

- what are the issues of interest to the group
- What is the process for deciding those issues among the stakeholders?

In the past these questions were resolved arbitrarily, with the organizers hoping to select issues and speakers that would touch a nerve. The logistical issues often made consultations among stakeholders unrealistic. The rise of the Internet has now made it possible for pre-conference consultation and governance processes via the net. In Africa, with the emergence of the civil societies, there has been a flurry of conferencing which is in many respects a positive, in the sense that people are organizing alternatives to national structures, and meeting to discuss solutions at a continental and even a global level. The UN and various multi-national development and aid groups have assisted in this process.

For example The African Information and Communication Technologies (ICT) Ministers, gathered in Dakar in September 2005, considered "Africa's Common Position on Internet Governance" and adopted these resolutions [I am not sure what this actually means in terms of public policy and IG];

- The establishment of a global consultation framework to review in depth the general policies on Internet Governance. Such a framework should authorise equal participation for all stakeholders (Government, the private sector, civil society, and international organisations).
- The expansion and reinforcement of the existing institutions for Internet Governance, to enable all stakeholders to participate and to ensure that Internet Governance is efficient, accountable, and democratic, and that Internet services and resources are distributed in an equitable manner among all actors and all continents.

The Conference also recommended;

- The Reinforcement of the role of the Government Advisory Committee (GAC) of the Internet Corporation for Assigned Names and Numbers (ICANN) in all Internet Public policy development issues.
- Internationalisation of root server management.
- African Member States should set up root server instances to facilitate access.

- Setting up of a regional high speed Internet backbone allowing the creation of national, sub regional and regional Internet exchange points.
- Participation of specialized African institutions in technical Internet Governance bodies.
- Reinforcement of the Internet Resource Management Institution, African Network Information Centre (AFRINIC), to guarantee the region's independence in Internet resources.
- Establishment in Africa of a reference framework for building a multi-stakeholder partnership at the national, regional and continental level, based on the basic principles of digital solidarity and in conformity with the spirit and provisions of New Partnership for Africa's Development (NEPAD).
- Contribution of African countries to the Digital Solidarity Fund (DSF) and utilisation of the Fund for building capacity, in particular for women and young people, and financing Internet-related projects in Africa.
- Implementation of programmes that guarantee the presence of African languages on the Internet and use of free and open source software in order to fight against the linguistic digital divide and ensure the participation of all in the emerging new society.
- The creation, in each African Member State, of a national structure responsible for the promotion and development of the Information Society, of knowledge sharing and the coordination of these structures at continental level.
- The creation of Centres of Excellence around Africa for capacity development.

Now this is all useful information, but how relevant is it in terms of reaching the influential people who make policy for Africa? Indeed, we need to look carefully at the huge and disproportionate expense of conference related activities in Africa and the developing world. What is the process for evaluating the relevance and success of these conferences? How can the conferencing process be optimized so that the time and resources expended have a measured impact in the field? IG has a role here in developing a process of linking groups together through what are called cross-sectoral partnerships, that involve people from various areas and fields working together to develop an integrated development approach that is effective and results oriented – not necessarily in the number of people fed, clothed or educated, but rather in a more qualitative approach that measures people's fulfillment in terms of seeing their quality of life improved at the community level.

Conclusion

When the Club of Rome first sounded the alarm, it was not very evident to many but today, development of the governance infrastructures necessary to enable this process of realization and actualization at both the individual and collective level is vital not only to humanity's continued success and prosperity but its very survival as a species.

2.7 Psychological Consequences of the Introduction of Internet Technologies

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One area of Information and Communication Technology (ICT) -widely understood as the global access to information, learning and support- is Internet technology (IT). In the last decade, the use of IT in partnership between public and private sectors has been encouraged in order to generate income and promote regional development. However, the undesired impact that these technologies may have in developing countries has not been totally addressed.

Since the arrival of third generation computers, and especially during the last years, the informatics era fostered changes comparable to the ones promoted by the industrial revolution. The introduction of the Internet has meant not only the improvement of communications, the reduction of distances, but also the increase of cybernauts, cell phone users, and blackberry users among others.

The number of computer and Internet users increases daily, this accounts for an improvement in communications at a global level, the implementation of educational tools and the development of virtual communities¹⁶². It also encompasses the appearance of a new human environment that implies a new way of relationships disregarding national boundaries, which leaves behind many other differentiations and mediations. Most commonly, at an average and individual user level, the Internet facilitates access to information and acts as a massive means of communication.

Internet is a tool with many advantages for education, commerce, entertainment, and even for individual development. It can be almost practically used for any single activity we can imagine. However, not all its consequences have been positive. In the last decade, research about the real effects it has on communication has attracted social scientists, from psychologists to economists (Castronova, 2005; Echeburúa et al., 1998; Kraut, 1998a; Young, 1996; Wallace, 2001). Researchers have shown that the consequences of using new Internet technologies have started to appear, most of them related to the way people communicate. Consequently, it appears that the new developments in IT have not only improved certain practical aspects of our way of life, but also introduced some distortions in communication and disorders that psychologists describe as consequence of abuse (Young, 1996; Echeburúa et al.; 1998; Griffiths, 1998; Grohol, 1999).

The Internet and its psychological consequences

Psychological research has been made regarding the excessive use of Internet, as having a negative influence on the diverse spheres of individual users, such as family life, friendships, work and studies. These have revealed several negative results on both interpersonal communication, and the development of social abilities.

Anonymity, as one of the main features of the Internet -and the one responsible for increasing its popularity as a tool to communicate and establish new relations- favors

¹⁶² Virtual communities are defined as social aggregations that emerge from the Internet when enough people carry on those public discussions long enough with sufficient human feeling, to form webs of personal relationships (Porter, 1997)

openness in the interactions which are also facilitated by its design and applications (Greenfield, 1999; Young et al., 2000). This often explains the loss of shame and fear to express oneself freely, and at the same time provides a person with a feeling of protection and freedom while avoiding face to face contact. Internet is an easier, inexpensive way of frequent communication, and it is convenient for people with difficulties in social abilities because the stress produced by social contact seems to be reduced by the “anonymity” that the screen provides and thus opportunities for virtual relations are less risky (Suler, 1999). Besides this, we also have to change in our businesses, social and personal lives to comply with the formalities and restrictions of information systems narrowing the scope of our choices and control (Rochlin, 1997). Internet does not demand merely a new set of skills; it is a new culture with mores, customs and its own rules of netiquette (Thieme, 2004).

Another important aspect to be considered is the development of social relations. Internet also offers an opportunity to experiment new ways of communication across both time and space. The openness facilitated by virtual environments can encourage users to act in a different way as to how they would act in an average social context, being able to elicit the beginning of new friendships or on-line dating, the expression of aggressive behavior, or participation in diverse interest groups. Internet also promotes the introduction and/or development of a new/alternative identity (Holland C.F. Suler, 2002). Then, a paradox appears, as Internet is a means which promotes improvement and enrichment of communication in the long-term it turns out to be potentially harmful to some people and their relationships. Internet can act as a substitute for the activities needed to maintain interpersonal relationships, such as going out with friends and talking by phone, because they have the same final purpose.

The research of Kraut et al. (1998a) found that the use of Internet reduces the social circle, family communication, and affects the general psychological well being of individuals, by replacing social activities and social ties such as friendships. On-line originated friendships seem to be more limited than the ones supported by physical proximity. However, two opposing viewpoints exist (Kraut et al., 2002). First, the time spent in these connections can decrease the time spent in other activities that include social contact, work, studies, sleeping or other individual activities such as reading. Second, on-line relationships could be superficial compared to the ones in “real life”. This can be due to the less accurate on-line communication compared to face-to-face relationships. Accordingly, people can be replacing solid social relations of real life with others of different quality established through Internet. Kraut argues that the increase of time dedicated to use the Internet is also associated to a more intense sensation of loneliness and depression. This relation has also appeared in other studies (Young and Rodgers, 1998b; Petrie and Gunn, 1998 C. F. Madrid, 2001; LaRose, 2001).

When meeting new people on-line, wrong images and impressions could be formed as the relationships exclusively take place through the screen, and the projected personality could be the only aspect considered to form an image about others (Wallace, 2001). Written words are the first level of contact, and as observer a user can only consider the characters typed to create an impression of other users. The lack of face-to-face

communication in a large number of applications offers an opportunity to experience new ways of expressing or presenting the own identity, including the possibility to alter information about gender, age, and the use of non-verbal communication. Some users choose to use or act with forms that allow them to take advantage or damage others, expressing antisocial behaviors and other “non-friendly” emotions encouraged by this anonymity (Holland C.F. Suler, 2002). While particular qualities of the Internet context partially determine how the user behaves, users and their own personality will find different ways of expression.

With the creation of an own username, which is a basic procedure for many Internet applications, it is possible to participate in different spaces and in different forms. In Internet, the first thing observed of a person is the electronic address or nickname. The information sent by the users about themselves contributes to build on this impression. A particular nickname will hereby determine the form in which they are perceived by other users. It results interesting that a large number of users have multiple user names, used with different purposes and in different contexts (Wallace, 2001). For instance, the use of forums or chat rooms requires the users to present a particular profile. Research suggests (Bechar-Israelí, 1996) that 45% of the users choose nicknames which are related to them, or which describe to a certain extent some characteristics of their personality.

Another unintended consequence of an increased use of Internet is the lack of sleep. Reducing hours of sleep can be dysfunctional. For psychologists, this symptom is related directly to pathological behavior. This lack of sleep could happen in the first stages of contact with this new means as a novelty effect (Wallace, 2001). However, the persons having difficulties controlling their Internet use display an ever-increasing need to use these services, and to satisfy this specific need the hours of sleep decrease (Young, 1999; Viñas et al., 2002).

It is common for regular Internet users to drop out of some of their usual individual activities such as reading books, magazines, etc. for academic or recreational purposes. Instead, users search for information in libraries, e-journals, articles, and publications via the Internet. More than a working tool, it also entertains allowing users to relax when playing games or downloading information not related to their productive sphere. This is a main concern for employers who restrict Internet access at the workplace. It is argued that besides entertaining, it reduces productivity while distracting people from their duties (Guerricaecheverría and Echeburúa, 1997). It is also possible that Internet acts as a substitute for entertainment due to the multiple applications that it makes possible, as chat rooms or IRC, reading news, downloading videos or music, etc. It is not necessary to leave home to access a hyperlink.

Social scientists have studied the use of computers for many years now, and some of them have argued about the excessive use of Internet. Furthermore, health professionals consider that the continuous use of this new technology can transcend the mere novelty effect. Sometimes these technologies incite compulsive behaviors comparable to gambling and sex, and nowadays Pathological Internet Use (PIU) - (Young and Rodgers, 1998b) and Internet addiction are about to enter the realm of diagnosed psychological

disorders, despite that since 1991 both terms have been used in trials (Thurlow et al., 2004). The difficulties generated by an excessive use of Internet, having implications on productive areas, such as work or studies can cause impaired productivity in addition to physical and psychological problems.

Nevertheless, not all consequences are negative. When Internet allows users to develop tasks or fulfill goals within controlled parameters that do not imply excessive use, the Internet is a virtual space that allows achieving exciting developments and to explore the world when staying in the safety of their own home (Suler, 1999). In general, it is possible that the stereotypes and dreads Internet brings over are denied, especially when not considering accurately the function that this means fulfills for certain users. For example, people who spend a lot of time in chat rooms or IRCs could have serious communicative difficulties, similar to the abuse that some users have of party-lines have because of their lack of resources to cope with loneliness and isolation (Guerricaecheverría y Echeburúa, 1997). This behavior can hide psychological deficits such as social abilities, communicative abilities or some other personal problems or disorders. Internet does not have an intrinsic capacity of creating addiction, but it can foster abuse in psychologically vulnerable people.

In some areas the domestication of these services is about to start, especially in developing countries. For this reason, we suggest that the psychosocial impact of Internet should be assessed in order to take better informed decisions when implementing these services. Internet is being introduced rapidly in different environments and becoming a part of our daily life, and the forecasts are that it is going to continue that way. Therefore, it is necessary to learn as much as possible about how this means can have a negative impact in psychological well being, not only because of personal, but also social changes.

Conclusions

Despite the rapid growth of Internet and of its consequences, there is a lack of in depth social and psychological studies contributing with crucial information for the comprehension of the abuse phenomenon. Nowadays, it is possible to find people who do almost all their activities with a computer, who live surrounded with electronic devices, for whom the cell phone and the e-mail form a part of their identity, and for whom leisure means the use of video games, digital channels of television or on-line gambling. For all these various features it is more feasible to address a disorder of diffuse characteristics characterized by the abuse of recent technology.

Some investigations have tried to consider the implications that Internet can have, both on the personality and users' behavior, but many consequences still remain unknown. Hopefully, in the near future more research about the consequences will be conducted, and not only about getting involved in relationships through this means; but also about the possibilities it offers to portray wrong images of people's personalities through the screen, and the respective social responsibility and security concerns.

Is the introduction of Internet technologies really having concrete effects in society? The answer is both yes and no, and maybe, much depending on who is answering the

question. Therefore, the moderate use of the Internet, as well as other technologies is advisable. Nevertheless, users should pay attention to how they use these services and the cost of time they spend on it. Compared to television, with its relative variety of programs, the range of experiences that Internet provides is much wider, provided that it offers the users choice and control. However, while fostering tolerance for diversity of views, it can also facilitate a narrowing of focus.

We suggest giving the Internet a positive meaning, using this means not only to learn about topics with people who share their knowledge through the network but also to access to specialized information. There are always other possibilities, seeing how to create them is the source of our actual power derived from the Internet. Internet can also imply aspects that allow supporting social relations, form interest groups, meet new people, and establish new relations and on-line communities. Virtual communities can act as an antidote to the pernicious effects of individualism which can be constrained by its voluntary nature (Porter, 1997).

The possibility of broadening the applications of this means, making use of creativity in the diffusion of new contents of personal interest, is an area currently gaining a lot of importance. Internet is both a symbol of and a vehicle for the transformation of work and life. The entertainment dimension has also led to the proliferation of devices whether they are cell phones, lap tops, digital music players, palmtop computers, handheld games, machines and navigational devices. This development promise needs a bit of work not only between the producers and the consumers but also at a national level in which health concerns need to be a crucial focus. Less than a decade ago, Internet was still the mystery and uncertainty of an unending cyberspace; nowadays, it encompasses a lot of our daily activities in ways that we have not appreciated and with consequences we have yet to understand. As this trend continues, it should be important to consider all the side effects that such means can cause if introduced without proper considerations.

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Part 3 Applicability of ICT for development

3.1 ICT for Development - A Critical Outlook

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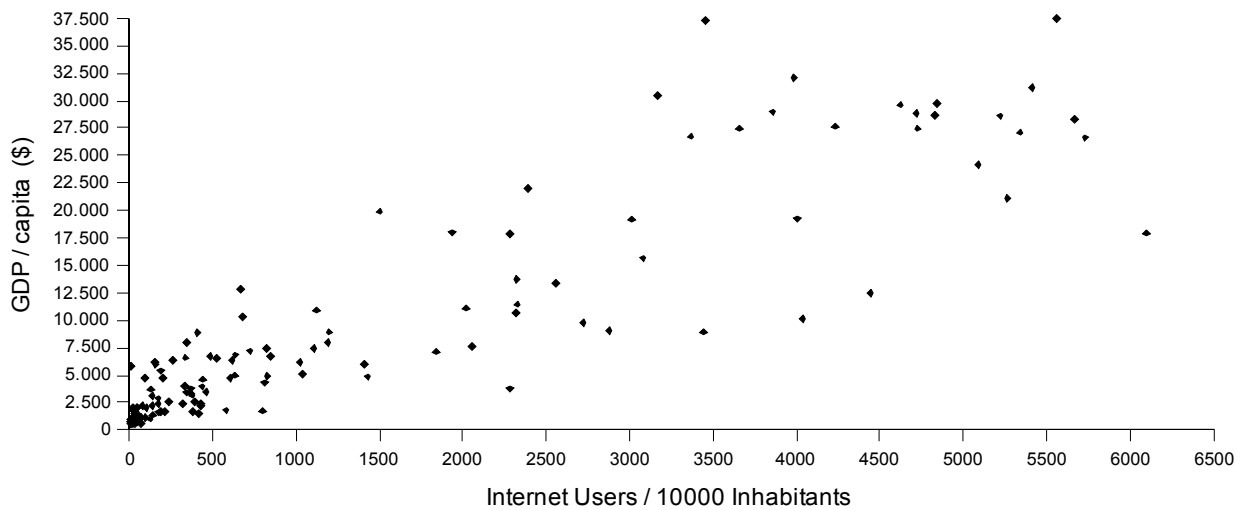
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Internet Access and the Distribution of Wealth

770 million humans on Earth are undernourished and 11 million children die from malnutrition every year. 1,000 million people are overweight and 300 million are clinically obese. The Germans (80 million people) spend about 2,500 million dollars annually for pet food and accessories. The average US-American causes 20 tons of carbon dioxide emissions per year, the average citizen in Sierra Leone only 100 kg. The average US-American produces CO₂ emissions for 78 years, the Sierra Leone citizen only for 37 years because life expectancy of people in Sierra Leone is less than half of the life expectancy of people in the US.

It is not surprising that the world-wide differences in wealth correspond also to a different degree of availability of information technologies. Whereas in some countries there is already a majority of the population using the Internet, in others the technology is hardly present. Details about the correlation between Internet access and wealth are shown in the following figure. There is a large digital divide correlated to the income divide between different states.



Internet Users and GDP per Capita in 2003 (134 countries included)

In most countries there is neither wealth nor could the information society be developed so far. The figure can be interpreted in various ways and the results can be very different from each other. They depend on the assumption which kind of causality is behind the correlation. In principle, there are four relationships possible:

- Interpretation No 1: Wealth is the cause for the development of Internet access
- Interpretation No 2: Internet access is the cause for wealth
- Interpretation No 3: Internet access and wealth call for each other
- Interpretation No 4: Internet and wealth have no causal relationship.

This seems to be an academic sophistication at first sight, but the different interpretations have tremendous consequences, when they are applied to policies for development. From the assumption that Internet is the cause for wealth it can be concluded that the main challenge is providing the poor with the new technologies and that they will subsequently develop their country and generate wealth. On the other hand, if the conclusion is correct that having Internet and other new media is just the consequence of already existing wealth, it would be reasonable to support the development of the traditional infrastructure of a country and finally there would also appear an information society.

Statistical analysis does not answer the question sufficiently. The Internet has not existed for sufficiently long, and it is not possible to examine whether poor countries which have put a focus on overall development (wealth first!) subsequently have better opportunities to create an information society or whether the strategy should be to invest primarily into the IT infrastructure in order to create subsequent wealth. Moreover, none of the variants exist in a pure form, most countries follow both options and there are always so many factors determining the speed of development that analysis is extremely difficult.

In the end, it might be reasonable to assume a mutual relationship. The information society is a tool for development and also a consequence of development. There is evidence for this assumption. On the one hand, it is not possible to deny that the information society cannot develop without the availability of financial resources and on the other hand, it is obvious that information technology can help to support economic and administrative activities significantly. But also in the case of a mutual relationship there will remain the question, in which direction causality has a stronger effect and it is therefore interesting to study the interpretations No. 1 and 2.

1. Is wealth the cause for the development of Internet access (Interpretation No 1)

This is at least historically true, because most of the countries which have a high level of Internet users today were wealthy already 20 years ago. The argument may also be supported by the fact that the digital divide within many countries runs along traditional inequalities, which are mostly related to income differences. There are different rates of Internet access between white Americans and those whose ancestors originate from Africa and also between men and women, between working people and the unemployed. Moreover the actual gap is higher than usually assumed. Not only do people in developing countries have relatively lower incomes than those in developed ones, it even happens that absolute costs for Internet access in some developing countries is higher than in the developed ones.

However, a straightforward causality relationship between wealth and Internet access cannot be proven. The lower Internet access in disadvantaged groups is also correlated to a deficit in education and that might be seen as well as a reason for lower rates of access. For example, in industrialised countries the share of the population having access to the web does not approach 100%. It seems that parts of the population are not interested in the new media, even though they could principally afford access. A minimum of wealth may be seen as a necessary but not as a sufficient prerequisite for the creation of an inclusive information society in which all members have access to information.

2. Is Internet access the cause for wealth (Interpretation No 2)

On the one hand, communication in modern societies and international trade are experiencing a boom. Information technology does not only help to make the world a global village, it does also increase productivity in the traditional industrial sector. Therefore there is no doubt that information technology and Internet access has a high potential for generating wealth. Also, it is not surprising that this opinion is strongly supported by many hardware and software providers. In recent years and even beyond the dot-com crash, they have been very successfully propagating the opinion that developing countries can catch up only if they are provided with the opportunities of the information age. The World Economic Forum published the so-called CEO charter for digital development, a "private sector commitment to transparently allocate human, in-kind or financial resources to reduce poverty in developing countries and disadvantaged communities through the use of information technology". Signature of the charter included the commitment to spend no less than 20% of corporate citizenship and/or philanthropy budgets to promote social, economic and educational progress in developing countries and communities through information and communication technologies. It is not surprising that the list of signatories was dominated by the IT industry.

*In what ways can information and communication technology improve human life?
(World Economic Forum, from the FAQ section of the digital divide initiative)*

ICT tools enable both economic and social development. This affects many aspects of our lives. For example, through the development of ICT, policy-makers, educators, students, entrepreneurs, business leaders and the regular citizen will have tools that:

- link hospitals, schools and libraries to the Internet to engage in information exchanges;*
- develop training programmes at telecentres or training materials focused on technical skill development;*
- promote democracy and participation in civil society such as online "town squares" where the community can exchange relevant information;*
- help develop and grow the local economy by providing an electronic link between local businesses or consumers to exchange information and conduct business.*

In addition, economic development can be propelled by the growth of ICT. A nation's competitiveness is tied to its capacity for ICT creation and application. Information and communication technologies represent two key factors: 1. Infrastructure enables the development and growth of market sectors, 2. ICT is a market sector and service in its own right.

Some difficulties have been reported

Problems with Internet projects are discussed today and the community tries to learn the lessons from it. For example, in Costa Rica the project LINCOS aimed to help some of the poorest towns to escape from their isolation. The project was run with an Internet trailer, protected by a tent (Amighetti 2003). The project turned out to be beneficial mainly for the wealthy coffee farmers, who started to enter into e-commerce: "Instead of aiding the poor, however, the project attracted the relatively rich. Its most avid users were some of the 1,500 coffee farmers in the region who traveled to LINCOS to learn how to market their products online. According to LINCOS staff, local residents were not interested in the project or used it only for accessing pornography and vice". Similar experiences can be made in many countries, whether one looks at an Internet café in Irkutsk/Russia, where privileged youngsters play online-games and some girls write emails to the "West", or whether one visits a point of access in Aydin/Turkey, where the

PC terminals are separated by walls on the left, on the right and behind the user and where a short look at the browsing history shows that the main interest of the previous users was related to pornography. The intention of many initiatives is to have young people sitting at the computers learning English online, studying mathematics but not enough educational information is presented on the web, and if it partly is, many people face a language barrier. And even if this barrier was overcome, it would be evident that many of the poor are not familiar with the Western type of abstract learning culture.

Another project about which there were reports that it did not work as expected was Gyandoot, an Intranet based government-to-citizen service delivery portal in India. It was designed to provide services like price information on agricultural products, help with legal affairs, employment news, grievance redressal (guaranteed answer by the district administration within 7 days), matrimonial service, free rural newspaper, Hindi language e-mail service and e-learning material. The service was delivered by distributed kiosks (Soochanalayas). In an examination (Centre for Electronic Governance 2002), a research team travelled to these kiosks and wanted to obtain information both from the staff at the sites and from the users. The results were very surprising: 9 kiosks were found closed during regular working hours, in 3 of these cases, the soochaks could be found and opened the facilities for demonstration for a moment. In the 16 places which were open, there was another surprise: there were practically no users at the soochanalayas on all days of the survey. The study team had to travel to common meeting points in the villages to locate the users of Gyandoot services. With considerable effort, the team could locate 32 users in all and obtain responses from them. The users were mainly farmers, located closely to the soochanalayas and the service which was ranked highest was the information about prices for agricultural goods. The project also registered that the revenues from the Gyandoot services were not adequate to breakeven. Some of the main conclusions were:

- *Gyandoot has not succeeded in attracting the rural poor to the soochanalayas. Even services like issuance of caste, domicile and income certificates have not enthused them, as there are better delivery mechanisms for these certificates in place today (caste certificates are issued in schools). Clearly, the rural poor do not perceive Gyandoot as a platform for them to seek services from the government, even when they have a need.*

- *Although the grievance redressal service had received some initial attention, it is losing its sheen, as the citizens are not satisfied with the response times as well as the responses to the problems registered. This is a very serious and oft-repeated complaint from all users.*

- *The beneficiaries of mandi price service, which perhaps has the highest number of transactions registered, are only middlemen and medium to large-scale, educated farmers, who possess the ability to absorb the risks associated with quick decisions making, or can wait for favourable market conditions to happen. Even here some of these beneficiaries have complained about the lack of timeliness in updating the prices, which led them to making losses. While the proven and cost effective mechanisms like radio broadcast exist, should the district administration deploy expensive ICT channels at its own cost to serve communities which in no way can be considered as poor or backward? Further, number of transactions for this category of service is high only in comparison with those for the other services and is quite low in an absolute sense.*

Learning from Experiences and Considering Complexity: Challenges for the Future

Just providing hardware and software and some training alone will not solve the problem of the world-wide digital and economic divide. The organisations that deal with development assistance are revising their concepts. After a phase of enthusiasm and the first disappointment about the technology, there is now a strong trend in literature which searches for ways to make IT provision in rural areas in developing countries "sustainable" (meaning to guarantee their maintenance and a minimum of profitability). Given the assumed mutual relationship between the information society and general development it will not help to transfer just one of the components to the developing world. If the other is missing, the mutually reinforcing effect will not occur. Today, in some countries information technology and economic developing are enhancing each other, and in others countries progress is very low. The challenge of the future will be the design of the transfer of technology and knowledge and balancing it with support of general development. If we will not succeed in this, the industrialized countries will leave the developing ones even more behind than before. The Club of Rome, following a holistic approach which includes many facets of the problematique, organized in 2005 in co-operation with UNESCO a world conference on ICT for capacity building. The conference focused on critical success factors and provided interesting insight to the situation. Among the success factors were among others local ownership and participation, flexibility and holistic and integrated approaches. The results of the conference are available on the website <http://esc.clubofrome.org/worldconference.html>

But even though there is now a shift from just "technologies for the poor" towards more balanced approaches, there are still many challenges ahead. Some of them will be discussed in the following sections.

1. Information technology is still not sufficiently affordable for people in developing countries

The IT-market is a global market with prices that differ less than prices for bread or vegetables in different countries. The global hardware and software providers are partially in a monopolist situation, in some IT related areas competition is very low. The fact that the costs for IT-infrastructure are not much lower in many developing countries than in developed ones, makes the relative position of people in developing countries worse. They are starting the "race to the moon" not from Cape Canaveral or Baikonur, but from the Marianas Trench. Some recent initiatives like the 100 Dollar-Laptop might change the situation, but still 100 Dollar is the income of 5 months of many employees for example in the Republic of Moldova.

2. Which technology is appropriate in which case?

Of course, lack of valuable information is a main problem. But how best to provide it? In 2003 the availability of radios was 156 per 1000 people in the low income countries and the availability of computers was 6 per 1000 (World Bank 2003). Why should we focus on that technology which is least available and why should we try to use just this for bridging the gap between the rich and the poor? If the Internet is to serve as a leapfrogging tool, it would have to be usable by the illiterate (37% of adults in the low income countries). In many cases satellite radio may be a better tool for spreading information. In other cases, mobile telephony can provide the best results and in others the 100 Dollar Laptop may be the preferable tool.

3. Balancing support is a difficult task

After all there remains the dilemma: how to decide about the role of support in the area of information technology versus development budgets for general infrastructure development. The strategies of organisations which deal with development co-operation tend more or less to the one or the other side. The European Commission (EC 2001) made a very clear statement on the problematique:

“One third of the world’s population has never made a telephone call. More than 3 billion people have no money to spend on communication services, or live in rural and remote areas, where access to information and communication technologies is scarce or absent. These facts are disturbing, but do not – as such – provide sufficient reason to incorporate the promotion of ICTs in development cooperation efforts. After all, one may question the relevance of talking about access to computers if the same people do not have electricity or clean drinking water. Development budgets are limited and development policy is a matter of setting priorities. This Communication makes one step forward. It is argued that, while ICTs are not to be seen as a priority sector as such for Community development cooperation, they do provide an important tool for more efficient and effective aid delivery and need to be recognised as an increasingly important element in the economic and social fabric of countries world-wide.”

Which reply should be given to humans who are suffering from a lack of food and drinking water and who need help to satisfy their primary needs? It is finally an ethical question, whether finally the primary needs of some of the the poorest are ignored in order to provide the countries with a new IT infrastructure which may finally improve their situation. But who can promise that this will really happen?

4. Access is Not Always Access

"ICT for development" was the motto of innumerable non-profit initiatives which started programmes delivering Internet to the poor. But help is often not as altruistic as it may seem at first sight. Western countries use development assistance to support their own industries. Many "computers for the poor" initiatives added the feature that a large number of credulous people made themselves (unintentionally) promoters of software monopolies. The absurdity gets visible by a comparison: imagine, companies from the developed countries provided cars as a support for infrastructure of developing states. Imagine they provided also a short instruction how to drive, but when the users wanted to have a look at the engine, they saw that the engine was inaccessible in a sealed box .

They have no chance to see how it works, but if the developing countries want to have a chance to catch up, they cannot build their new infrastructure on black boxes.

5. Lobbies Are Around

Lobbying plays a major role in modern politics and administration and follows public spending. One may regard it as a legitimate means to promote positive intentions, one may regard it as a tool to follow selfish and hidden agendas which direct resources and the development to wrong directions. We have to accept lobbying as an existing phenomenon but we might develop mechanisms to unmask hidden interests. This is usually not difficult in the case of industry, and in most cases industry representatives do not hide their economic interests. But what about the large number of "independent advisers"? What about interests of the elites in developing countries which have a high interest to be part of the global middle or upper class? What about the interests of scientists who use the subject for acquisition of funding for research projects that promote their career and what about NGOs which need money for maintaining their infrastructure?

6. The role of global frameworks

Human life on our planet is today embedded in a global economic system which is based on competition. But in competition there are always winners and losers. And losing in a global economy is not like losing in a sports game, it means suffering of millions of people all over the world, in Sub-Saharan Africa as well as in former Soviet Republics in Eastern Europe. Especially the situation in some former Soviet Republics shows that countries will find themselves in a disaster if they cannot compete on the global markets. Therefore, the developed states are also in a dilemma. Any of the developing countries which undergoes a successful transition to a knowledge-based economy will be a competitor. Thus it is not surprising, how the European Union saw its role in the future and how this was described in the Lisbon Agenda: The aim was to become "the most competitive knowledge-based economy in the World" and this aim was clearly to leave all the others behind. It was not an agenda of co-operation, it was an agenda of enhanced competition. But whether information technology can succeed in bridging the gap between the poor and the rich on this planet will finally depend on the honest will of the wealthy countries to share both resources, knowledge and infrastructure in a way that makes it possible for the developing World to learn, to adapt what they have learnt and finally to make it better than those from whom they have learnt. Can we be sure that within the present global frameworks such a co-operation is not an illusion?

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3.2 The Global Marshall Plan: Making use of ICT's potential for a World in Balance

Maike Sippel

Maike Sippel studied architecture at Karlsruhe University and in Florence from 1996 to 2002. During this time she participated in the founding of several organisations in the fields of ecological building design, sustainable development and globalisation. From 2003 on, she built up and led the coordination office of both the Global Contract Foundation and the Global Marshall Plan Initiative - www.globalmarshallplan.org.

In 2003 she started her phd on north-south citypartnerships and climate protection activities under the Kyoto Protocol. She is a member of the research group International Climate Policy at the Hamburg Institute for International Economics and her phd is funded by the Deutsche Bundesstiftung Umwelt. She is becoming mother in May/June 2006.

At the beginning of the new millennium, the world is in an extremely difficult situation. Technical revolutions – especially in information and communication technologies – have led to rapid economic globalization. Innovations are occurring at a speed never observed before, multinational cooperations operate across borders and they are able to bypass nationally regulated jurisdictions. Facts that have led to the loss of the primacy of politics since the political core structures have remained national or regional at a maximum: The world economic system of today suffers from the lack of an adequate global framework that combines markets and economy with societies, cultures and nature.

Despite growth rates in trade of goods and financial transactions unseen before, the global situation regarding the state of the environment, poverty, distribution issues and partnerships between cultures is getting more and more out of balance: The earth atmosphere is warming at a higher speed than at any point in time during the last 60,000 years – due to human caused greenhouse gas emissions. While 24,000 people die every day from hunger and half of the world's population live on less than 2 Euro a day, at the top of the income pyramid, the world's billionaires experience the highest growth in income-increase ever. And it is through the outreach of information technology into the most abandoned African villages that this enormous gap between the few very rich and the mass of the world's poor is present in virtually everybody's living room. The frame of reference is no longer local or national, but has become global.

Information and communication technologies are important drivers of innovation that we need both to solve the globe's environmental problems and to generate a value added that enables all human beings unfold their potential. However the information and communication technologies by themselves seem not to have solved the world's problems yet. They have not brought the economy they helped to unleash into harmony with societies, cultures and environment.

In the situation we are facing today, where a small number of ever richer people have to stand their ground and defend themselves and their living styles against the masses of the poor that are totally aware of the world's unfair distribution patterns, information and communication technologies even pose a huge threat towards civil liberties: In the name of "homeland security" and the "war against terror", your email communication is already being scanned for suspicious expressions as a matter of routine and google will most probably have to submit your search-patterns to the same US intelligence services that already take track of any of your recent flights (including which meal you preferred, etc.). And there is much more you can think of: In some of Berlin's most up-to-date music clubs you can already pay your drinks by a chip implanted into your upper arm, and in my same country of Germany, dogs are "chiped" routinely so you can easily find your loved one in case it gets lost.

The question arises whether there is an alternative to the developments we are experiencing right now and what such an alternative would look like. The Global Marshall Plan Initiative, an open platform of organisations and individuals from science, politics, economy, civil society and diverse religious groups joint in their effort to give

globalisation a human face, has formulated a realistic and pragmatic concept for a “World in Balance”:

Concept for a “World in Balance”

The concept for a World in Balance is based on basic ethical and moral principles that are shared by all of the world religions as well as intercultural humanism. It is inspired by the Earth Charter and a global ethics. It is based on the principle of justice and in particular the golden rule of reciprocity: “Do unto others as you would wish them do unto you.” With regard to today’s societies, it recognizes our responsibility for the realization of human dignity and the fulfillment of all human potential. With regard to future generations, it recognizes the special responsibility that we, as human beings, have for the planet earth, and the natural foundation of life. These two aspects correspond to a social and ecological orientation of our action.

The concept for a World in Balance consists of five components that are mutually interrelated: the implementation of the United Nations Millennium Development Goals until 2015, along with raising of an additional 100 billion US\$ a year from 2008 to 2015 to achieve these goals. These additional resources shall be financed i.a. through global taxes. Beyond 2015 the concept aims at the realization of a fair global partnership via a worldwide Eco-Social Market Economy. This would consist of mechanisms of co-financing of development combined with an adequate global institutional design, the implementation of good governance on all levels and new forms of appropriation of funds directed to the grassroots level in order to enable self-determined development. These five core components are further illustrated below.

1. Implementation of the globally agreed upon UN Millennium Development Goals by 2015

The concept for a World in Balance considers the realization of the United Nations Millennium Development Goals of 2000, signed by 191 nations, to be an important first step. So the following goals should be achieved by 2015:

1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria, and other diseases
7. Ensure environmental sustainability
8. Develop a global partnership for development

2. Raising of an additional 100 billion US\$ per year that are needed to achieve the Millennium Goals

According to different sources, roughly 100 billion US\$ per year at an average are required

for realizing the Millennium Development Goals from 2008 to 2015 in addition to the current volume of official development aid – as compared to 2004 development aid and purchasing power parity. The additional funds will have to be used following mechanisms of development cooperation significantly different from the ones used up to now, as shown below in point 5.

The funding requirements are based on 2002 analyses of the United Nations (Zedillo-Report), the European position of the British Chancellor of the Exchequer Gordon Brown, the investigations of several UN-agencies as well as the analysis of George Soros in his efforts for an open society. Although based on different perspectives, the listed studies all come to the same conclusion: Additional to today's volume of official development aid another 100 billion US\$ per year at an average from 2008 to 2015 will be needed to realize the Millennium Development Goals.

3. Fair and competitively neutral raising of these necessary resources – also by burdening global transactions

The concept supports the ongoing efforts to achieve the 0.7% GDP goal for official development aid from national budgets, and endorses the creation of fair competitive conditions in the agricultural sector and improved North-South cooperation in this field as well as reasonable methods of debt relief for the less and least developed countries. However, the focus of the concept for a World in Balance is on new financial funding sources. These shall be based on global added-value processes and therefore neither strain national budgets nor distort competition. Possible financing mechanisms are a levy on global financial transactions (Tobin-Tax), a Terra-Tax on world trade, trade with equal per capita emission rights, a kerosene tax, or Special Drawing Rights with the IMF.

4. Gradually establish a worldwide Eco-Social Market Economy with an improved socio-political framework for the world economy ...

...e.g. through adequate reforms and the interlinking of established rules and standards agreed upon for economy, ecology and society (e.g. in the regulatory realms of UN, WTO, IMF, World Bank, UNEP, ILO, and UNESCO) in connection with co-financing of development.

In order to create a World in Balance, a worldwide Eco-Social Market Economy is needed, that, for the wellbeing of all people in the world, combines markets and economies with globally binding social, ecological, and cultural standards. These standards can be defined depending on the respective development status. Key to a consensus on the implementation of such standards and the introduction of adequate worldwide governance structures are the further opening of market systems, as well as co-financing measures taken by the rich countries for the benefit of developing countries.

In return, developing countries are required to agree to the implementation of such standards, even though this implies giving up certain competitive advantages.

The enlargement process of the European Union serves as a conceptual model for combining co-financing and the compliance with eco-social standards (this enlargement, however, requires a better financial support than it is the case in the current enlargement round).

5. Precondition for the achievement of a reasonable institutional design is a fair cooperation in partnership and an adequate flow of funding of development. The promotion of good governance, fighting corruption and a coordinated appropriation of funds directed to the grassroots level are decisive for self-determined development.

Perhaps the most difficult aspect of the concept for a World in Balance is finding an effective way of translating money into self-governing development. Besides the fulfilment of basic needs, the goals for providing financial aid are: help people to help themselves, develop local human potential as well as ownership of development and projects. Coordination and continuity of development aid flows are decisive regarding the donor community, commitment to good governance and a transparent dedication of funds to poverty reduction and promote sustainable development are key on the side of receiving countries. Therefore donor coordination, long-term development commitments on both sides, transparency and control of the flow of funds (in order to prevent corruption), as well as the subsidiarity principle (bottom-up) are guiding principles for the appropriation of funds.

Practical experiences show that participation, education, and empowerment of women especially contribute to an independent and responsible development. Concrete examples are micro-financing, renewable energies, and cooperation with local development workers.

Implications for information and communication technologies

With regards to the information and communication technologies, the following aspects seem crucial to realize a World in Balance:

- ICTs are not an end to themselves. We must make sure to use them as a tool and driver towards the aims we have postulated in several UN conferences of the 1990s, beginning with Rio 1992, and reinforced in the Millennium Declaration in 2000 and in Johannesburg 2002: Let “Sustainable Development” be the guiding principle for the information and knowledge society.
- Developed and implemented correctly, information and communication technologies hold a huge potential to solve the problems of our generation. They could play an important role for education that is a fundamental factor in the fight against poverty, in creating infrastructure as well as improving medical facilities. However when used to promote development, forms of ICTs must be found, that

find local ownership, can be managed and replicated independently, and that really address people's needs. In this context, ICTs are not just about personal computers and the internet, but also about community radio, weather forecasts or a basic link to the rest of the world via a village-telephone center.

- ICTs may not be allowed to further deepen the gap between north and south or create new ones inside our own countries. The existing inequalities between the rich and the poor, but also between young and old, or urban and rural population also have had impact on their respective possibilities to make use of ICTs for the lives: Access to ICTs and a certain ICT-literacy are essential prerequisites to remain up to date or to catch up in the information and knowledge society. They must therefore be at the center of our attention.
- The potential ICTs hold for environmental protection is of crucial importance to contribute to the solution of the ecological problems we face. To direct innovation in ICTs in such a direction, suitable framework conditions have to be put into place, that promote efficiency and lower consumption of resources. At the same time, the negative effects of this technology on the environment, e.g. the problem of disposing of electronic devices, needs to be kept in mind.
- Cultural diversity is both an important aspect of sustainable development and deeply linked to the use of ICTs. Although ICTs could serve to conserve and nurture our cultures, traditions and languages, today, it is mainly the industrial countries, that one-sidedly determine the information and knowledge society with their advertising, movies, internet services, or hard and software. Such a dominance is deeply counterproductive when it comes to build the common global civilization we need to solve our common global problems. There must be a shift towards using ICTs to make it possible to interact and to learn from one another. Legislation around ICTs should ensure that there is a guarantee for freedom of expression and it should protect, and help communicate and develop new and integrated perspectives and identities.
- Technically, ICTs allow for the active participation of people in the building of a sustainable information and knowledge society. Again, it depends on the framework conditions, that firstly must permit and promote access to the information society as well as the opportunity to freely express opinions – without the threat of physical, psychological or any other form of discrimination. The human right to “freedom of speech”, as stated in the Human Rights Declaration, must be upheld in the information society.
- The information society naturally holds ample possibilities to collect and utilize information on people and their habits and moves. Therefore measures to ensure personal freedom of every person must be a central part of all policies around ICTs. The technologies should not hinder communication, and the rights of the individual to control his or her personal details and data must be respected. The protection of people's private space is as important in the so-called cyberspace as

in the real world – a fact that has been neglected or even totally ignored in many societies.

At the World Summit on the Information Society (WSIS), held by the United Nations in 2003 in Geneva and 2005 in Tunis, some of the above mentioned aspects were discussed during the negotiations, pushed by many civil society organizations, and also some governments. However, the results of the WSIS do not sufficiently address the issues of human rights and freedom of expression, that stood at the center of the well organized civil society during the WSIS process. The same is true for the issue of bridging the digital divide and necessary funding mechanisms and capacity-building to achieve this. The issue of ecological sustainability was not at all at the center of attention. It must be said, that the WSIS has not set the course for a sustainable and development-oriented information society.

The new technologies hold a huge potential if adequately utilized to achieve a World in Balance and better the existing disastrous situation for the future. It will depend on joint action of politicians, economy, science, media, and the civil society, both in the North and the South, as to what degree the aspects mentioned above will be met in the design of the information society.

And it is up to us, to contribute – in our spheres of influence, with our special capacities and knowledge. It is not the technologies, that can solve the problems, but it is us!

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3.3 Overcoming Technological Divides

Ildiko Tulbure and Aleksander Zidansek

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Dr. Zidanšek studies condensed matter physics with applications in liquid crystals, fibrinolysis and environmental protection. He is also interested in theory and practice of sustainable development, in particular dealing with issues of technological divides, education, dialogue and sustainability indicators. He is an Associate Member of the Club of Rome, an Associate Participant of tt30 and Secretary General of the Slovenian Association.

tt30 deems the issue of *Technological Divides* a priority; it is extremely important to address problems such as the existing gaps between as well as within societies. These gaps are constantly increasing because of rapid technological progress.

The project "*Overcoming Technological Divides*" evaluates existing Divides in society concerning the use of new technologies and proposes appropriate strategies for overcoming the Divides. The project was launched in August 2001 and covers a period of several years.

The project has been defined with two main parts. The first part is covering an analysis and diagnosis of the existing situation in the field of Technological Divides i.e. access to, ability to use and effective use. The second part of the project deals with finding and proposing appropriate strategies and measures for how to overcome Divides by considering regional differences.

Main results of the project work

In the current project period, a comprehensive systematic analysis and diagnosis of the existing situation in the field of Technological Divides on a global level have been carried out. European, African and Latin American regions have been especially taken into account in comparison with the situation in the US and Japan.

We started at the beginning of the project with a standard definition for *Technological Divides* would be: gaps between societies or specific societal groups in access as well as in ability to use new technologies in practice. Using our studies and analyses during the project work we can conclude that this definition has to be adapted by taking into account regional differences, mentalities, traditions and understanding ways of what technologies are and how have to be used. Only by taking into consideration these aspects a real and true diagnosis of the existing world-wide situation in the field of Divides can be made. This makes of course the problems much more complicated than they have been before.

Although European countries may seem initially not to be affected by the Divides the careful analysis of the situation permits one to recognise that there are Divides between European societies and within societies between generations. More interesting is the fact that even within a country there are significant regional differences concerning the Divides, particularly between big cities and rural areas. A gap has also been recognised between people of different educational levels.

For the study of the Digital Divide in Europe, we recognised three categories of countries:

- The first group is fully "on-line" and is taking full advantage of Information and Communication Technologies (ICT) (mostly Northern European countries),
- The second group is "on-line" but still has problems in fully using ICT (mostly Western and Southern European countries) and
- The third group is moving slowly into the information age but is lacking appropriate infrastructure as a first condition (mostly Eastern and South-Eastern European countries).

US has the leadership regarding IT infrastructure, but not regarding mobile phones, for which the leadership belongs to European countries.

Technological Divides in Africa

For African countries we remarked that the level in the access to and the use of ICT is much more lower than for European countries. We can recognise three groups of African countries regarding the access to and use of ICT:

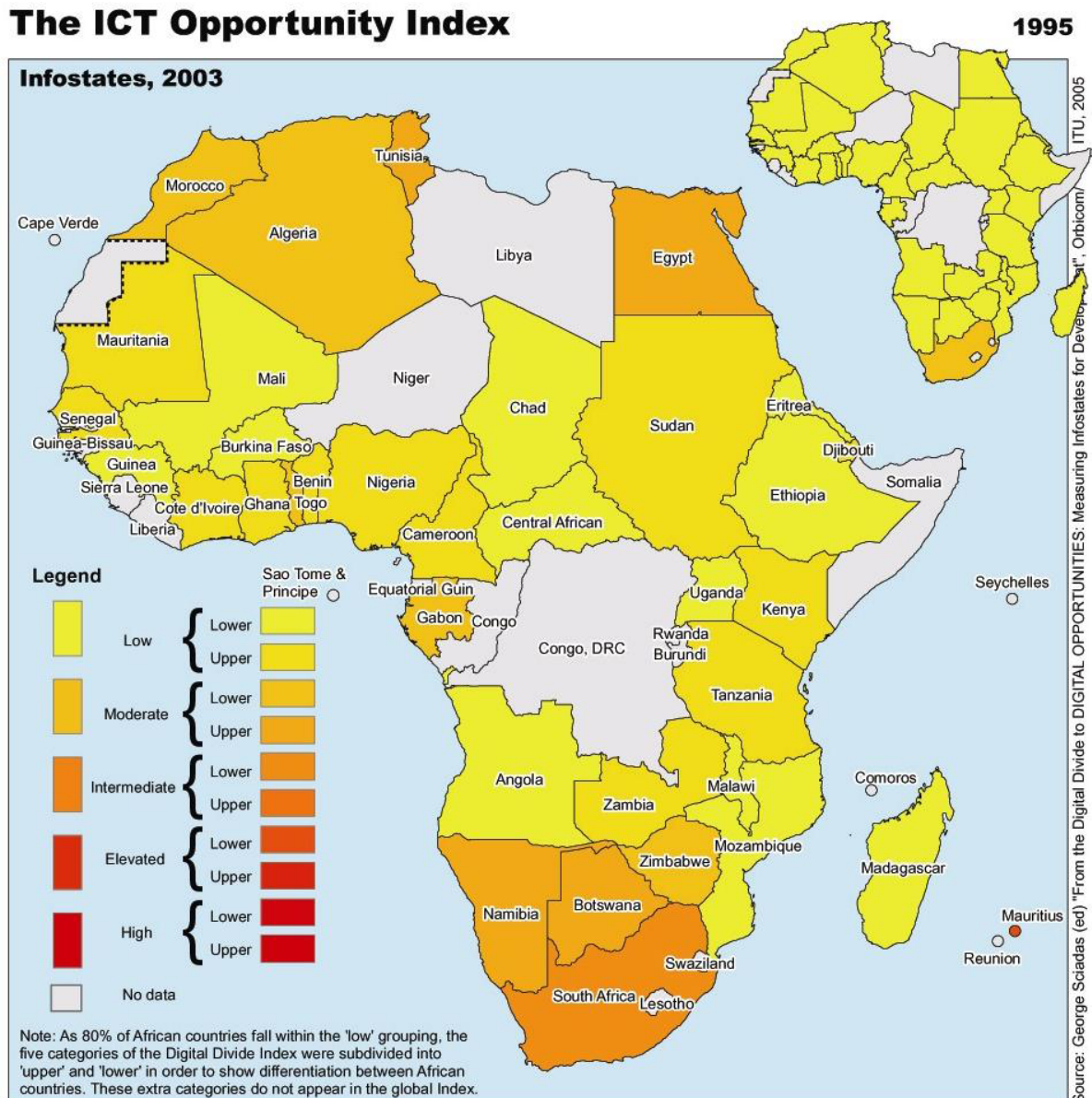


Figure 1. ICT Opportunity index for Africa in 1995 and 2003 (Source: George Sciadas (Ed.) From the Digital Divide to Digital Opportunities, ITU 2005, from: http://www.itu.int/ITU-D/ict/statistics/graphs/ICT_OI_1.jpg)

- The first group trying to establish the use of ICT, such as South-Africa and Egypt,
- The second group being in the very beginnings of establishing an infrastructure and use of ICT, such as Gabon, Cameroon, Kenya,
- The third group being almost absent from the developments regarding ICT, like Zaire, Ethiopia, Chad.

It is important to stress that while Africa is significantly behind the world leaders in ICT, there has been notable progress (Fig. 1), particularly in the South Africa and North Africa. There are also many international initiatives, particularly by the International Telecommunication Union (ITU), which aims to bridge the digital divides with the initiative “Connect the World”. This initiative aims at bridging the digital divide, and is focused on people working in partnership (see also: http://www.itu.int/newsarchive/press_releases/2005/07.html).

For African regions we recognised an important Divide also in the field of energy production, distribution and use; we called it as Energetic Divide. This gap in energy use brings other gaps, like in use of technology, in economic development, in education possibilities of young people.

Technological Divides in Latin America

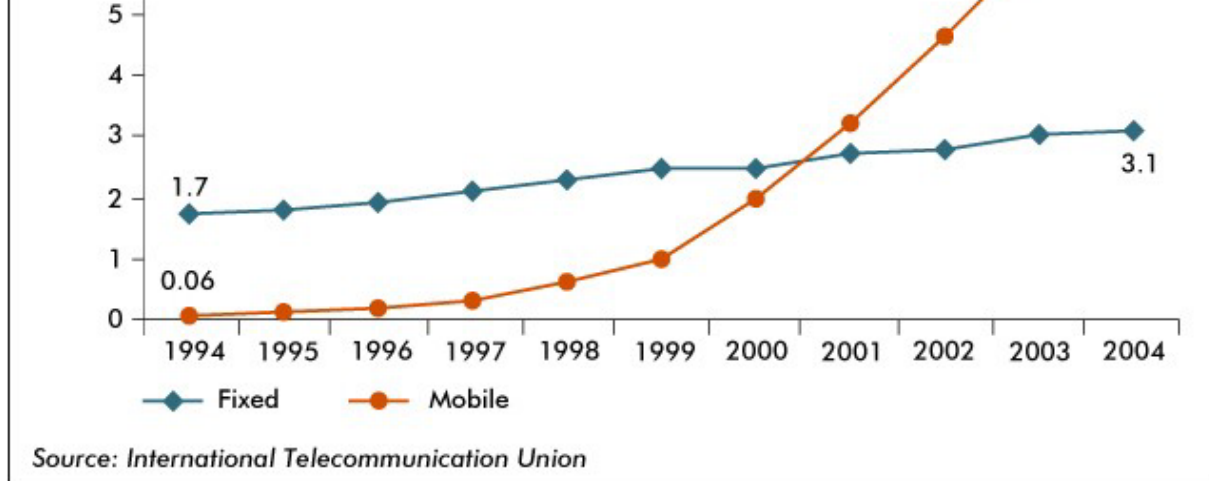
For Latin American countries we recognised Divides as well. There are Divides among these countries but also in comparison with other world regions. In global comparison there is a Digital Divide, but having another quality than the Digital Divide between African and European countries. Latin American countries can be divided in two categories of countries:

some being at the top of the ICT developments (Argentina, Brazil, Mexico) and others being in the beginnings (Nicaragua, El Salvador, Bolivia).

The Latin American countries being on the top of the ICT developments in Latin America are situated in a middle position in an international comparison. It can be concluded that the situation of the top countries regarding ICT in Latin America is similar to the situation of the Eastern European countries. The poorest countries from Latin America are comparable with the middle situated countries from Africa.

Opportunities and Challenges for Developing Nations

An interesting development for Latin American and African countries is represented by the growth of the mobile phone subscribers (Fig. 2). A comparison of the situation regarding telephone mainlines with that of mobile phone subscribers deliver the conclusion that in the last years the mobile phone communication registered a very big growth. In countries like Bolivia or El Salvador the number of mobile phones is bigger than the number of telephone mainlines. This is an example for how to bridge the communication Divide by using newest technologies.



International Telecommunication Union, from: <http://www.itu.int/ITU-D/ict/statistics/ict/graphs/af5.jpg>). The exponential growth of the mobile telephone subscribers provides an opportunity for leap-frogging the development without the need for an expensive fixed telephone infrastructure.

It has to be pointed out that the comprehensive world-wide analysis and diagnosis of the situation regarding Divides has been very difficult especially due to the fact that data are not always available, data mining is a difficult process. Also, regional differences and different mentalities make that data are compiled sometimes using other basic measures. The interpretation of indicators and of usage of technologies can be different in different world regions.

In spite of this situation, the weightings in the different activities to overcome divides do not always correspond to the real needs. This is exemplified by the fact that for instance out of all European ICT projects, only about one-fourth are located in eastern Europe and about three-fourths are in the western Europe, even though the needs for development in the field of ICT are clearly greater in the eastern part of Europe. For African countries a lot of projects started recently for bridging the Divides. The focus is not only on Digital Divide, but mainly on improving basic infrastructure and in energy field. Reasons are other urgent problems with which the African world is confronted. The same situation exists in the poorest countries of Latin America.

Technological Divides and Sustainability

There is a general belief, that by realising the *Information Society for All*, the sustainability of our society will be naturally assured. Contrary to this widespread belief, the results of the project work show that, should the present ICT usage patterns continue the sustainability of our society would be questionable. Our work demonstrates that the emergence and use of ICT have, in addition to the primary (desired) effects, secondary (negative) ones in all human activity fields and the environment.

We conclude that while the development and expansion of the Information Society is necessary, *it does not assure per se* the sustainability of our society. From analysed scenarios for European conditions came out that, for instance, an increase in the efficiency of technological applications by using IT-applications does not automatically lead to a decrease of energy use and of environmental stress because of changes in human values and lifestyles. So called "*rebound-effects*" do, in some cases, eclipse the positive effects of efficiency increase. Rebound-effects are to be expected not only in the

energetic and environmental arenas, but also in the social and cultural sphere. Potential rebound-effects represent a danger for the sustainable development of societies.

Scenarios for the Future

Scenarios are very important to point out the chances and challenges related to the emerging Information Society. In the context of the project we analysed the various possibilities to develop scenarios. We recognised two important ways, like using models and running simulations, or by using scenario writing. Both of methods has advantages and disadvantages. We analysed the concrete situation of Slovenia based on an analysis of existing programmes on national levels and possible future developments as results of these programmes. As an important conclusions it came out that the *ICT education* already in primary schools has a positive effect on the emerging of the Information Society, but not only an education for use of ICT but combined with an education which promotes the values of sustainable development.

Education as an Opportunity

Making a comprehensive analyses of the world-wide existing situation in the fields of Divides we concluded that the issue of *education* is one of the most central points in this regard. We consider *education* as the key issue in promoting the properly use of technologies, of ICT and in promoting sustainable development, thus in finding solutions for overcoming Divides and for sustainability of our society. We called it a "holistic education for sustainable development". In his book "Continuity, Innovation and Change", HRH El Hassan bin Talal, President of the Club of Rome, pointed out the need for education as a key issue for achieving these three human goals: continuity, innovation, and change. This three desiderates will actually be assuring the world-wide sustainable development.

We studied *education* in a systemic way and we recognised three important dimensions of education: *infrastructure, methodologies and values*. All these three dimensions of education are of crucial importance for the educational process regardless about which region we are taking about. *Frameworks* (economic, politic, social, cultural) are, in our opinion, the bound element between these three dimensions. The question we followed was how do these three spheres influence the educational processes and how important are these three spheres in this discussion. In our trying to better understand the impact of these on education we detailed these three spheres and defined for each of these three spheres important elements in form of quantitative or qualitative indicators.

In order to test their sensitivity with regard to educational processes we developed a *mathematical model*, not a classical one, but one based on newer analytical tools, i.e. fuzzy logic. By using fuzzy logic the possibility to consider qualitative or uncertain information in systems modelling is given, which encourages applications in several interdisciplinary fields. Regarding infrastructure, methodologies and values, we tried to find similarities for different world regions, this means same characteristics for similar regions. Several simulations in form of some scenarios have been run by using the fuzzy logic based model.

Conclusions drawn show that the available infrastructure is not the most important issue for properly educating people from the comprehensive aspect of sustainable development. Even more, the sphere of values do play a very important role. In the field of environmental education we found out that values are decisive. Also educating world-wide people for tolerance and for accepting other cultures or traditions is much more important than having a good infrastructure. Of course these considerations are valid for basic education, and not for high level for research goals. The developed model is a simple one. Its goal is not to give some numbers sets as a result, but to help discussing on a scientific base about what should be made in order to improve educational processes with the common goal of sustainable development and of a better world.

Conclusions

A general challenge researching the field of Technological Divides in a holistic way is the fact that existing indicators used to describe Divides make hardly possible a comprehensive state diagnosis. These indicators characterise the technical infrastructure and the usage rates of technologies, but do not express the real personal skills, real needs of the society, the real values and the real quality of life. On the other hand, indicators for quality of life used nowadays do not allow measuring the impacts of using ICT on welfare such as, for instance, the famous Human Development Index (HDI) of the United Nations Development Programme. Exploration of the connection between indicators for ICT field and quality of life, taking into account regional differences, is till now only sporadically been made. New methods are needed which allow the integration of qualitative aspects and quantitatively described indicators.

Outlook

The next steps of the project work should involve the comprehensive qualitative analyses of the world-wide situation regarding Divides. The findings of the project and proposals, like rethinking what Divides actually are, but by taking into consideration regional differences, or reconsidering the issue of Education as the most stringent one for overcoming Divides and for ensuring sustainable development have to be spread out in the next steps. We assume that by delivering the project ideas and findings, we will contribute to fostering dialogue between and within societies concerning the field of Divides.

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3.4 Telecenters in Nigeria

Gbenga Sesan

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Nigeria, like most other countries, is fast responding to the dictates of the New Economy. Driven by Information and Communication Technologies (ICTs), the New Economy presents both a challenge, and an opportunity: the challenge of *catching* up with developed economies in order to ensure global competitiveness, and the opportunity to use new technologies in present-day processes towards an increase in efficiency. As is becoming increasingly evident, nations that are committed to active participation in the New Economy are able to translate this into appropriate accelerated development opportunities. In line with this need, Nigeria and other African countries are stepping up to maximize the opportunity that pan-African and global processes offer.

Recent developments and the nature of developing national ICT policies (and strategies) have revealed that ICT policy decision making processes are continually built on these national attempts, especially as the world moves towards bridging the digital divide – between and within nations and regions. A major recurring index in all these attempts is the need for increased access to Information and Communication Technology tools, which becomes more important in developing economies where individuals are tempted to remain busy with the task of securing the next meal. The need for public access cannot be over-emphasized, and this gap was first filled by cybercafés that sprang up in major cities in Nigeria.

Caslon Analytics defines a cybercafé as “... a commercial venue where members of the public can access the net for a fee, usually per hour or minute. Some cafes offer unmetered wireless access. The venue will generally offer beverages and food; declining connectivity prices mean that most cybercafés now based their revenue on retailing comestibles rather than bytes¹⁶³”. This holds true for Nigerian cybercafés, but the beverages and food would be mostly missing. Nigerian cybercafés came to the public access rescue and can now be seen competing with each other on the same street, even though their spread is still very much limited to urban communities – owing to the perception of most cybercafé owners that they can only get good returns on their investment if they set up such facilities where the people can afford to pay for them.

Users are charged at an average rate of \$1 per hour (with some cybercafés also providing half-hour and by-the-minute options). Bandwidth and general quality of service (including the ambience of the facility and back-up power supply) influence the pricing system of cybercafés. In all these, one major challenge for cybercafé operators in Nigeria has been that of merging their expansion plans with cost realities. For each cybercafé to commence operations, there is the need to consider costs associated with internet access, staff recruitment, equipment procurement and maintenance, network setup and back-up power supply. Back-up power, in this case, does not refer to the need for 30-minute back-up equipment, but a steady means of continuous power supply that can cover up for the present inadequacies of the national power utility company (*Power Holding Company of Nigeria – PHCN*) which is presently undergoing reforms (like many other sectors of the Nigerian economy) in order to be able to meet Nigeria’s power consumption needs. And for internet access, the situation is critical: while service providers abound, it is difficult

¹⁶³ Caslon Analytics (2006), *Cybercafés*, Retrieved February 3, 2006, from the World Wide Web: <http://www.caslon.com.au/cafenote.htm>

to get a reliable internet service provider – and when such is found, the related costs are simply unbearable for small businesses.

It is also sad to note that some of the cybercafés that have so far helped bridge the gap between majority of the population and access have been forced to *close shop* due to various factors that impact their business. Even with the emergence of successful cybercafés in the Nigerian public access space, the issue of *general* access (regardless of physical location or economic status) is largely left unaddressed. The cost of setting up a cybercafé, and getting its services up and running is discouraging to those who may have the mind to extend services to rural areas, but are also conscious of the need to break even and make profits for the cybercafé business. This is where telecenters have come to the rescue, even as cybercafés increasingly get recognized as telecenters themselves.

The Emergence of Telecenters

The definition of a telecenter is as varied as the possible number of services that the different models that exist can provide. For example, a *whatis.com* definition of a telecenters is “a work location usually in a different place than the organization's main office that provides convenient occasional access for telecommuting to work equipment that they don't have at home or on the road¹⁶⁴”. In *Lessons from the Field: ICTs in Telecenters*, the Digital Dividends project opines that “Telecenters are one of the most rapidly growing applications of ICTs in the developing world. Their rationale lies in shared-access models that allow provision of a wide range of services to more users at lower cost than privately-owned home or office computers which are often out of financial reach of poor people¹⁶⁵”.

Telecenters are becoming more popular as the global community takes the task of bridging the digital divide more serious. Governments, private sector entities and civil society organisations are deploying telecenters projects either as sole providers, or as partners. Global distribution of telecenters includes the 24% led by for-profit organisations, 62% operated by non-profit institutions, and 14% initiated by government. In terms of location, 33% of telecenters are in Africa, 37% in Asia, 3% in the Caribbean region, 6% in Central America, 1% in Europe, 3% in North America, 4% in Oceania, and 13% in South America¹⁶⁶.

In Nigeria, telecenters would then generally refer to those public service providers that offer ICT services (such as word processing, printing, copying, fax, calls, internet access, training, etc) but various models exist. Some adopt for-profit business models, while others are non-profit outfits – which are popular in rural areas and are managed by non-profit organisations. The cost of setting up these centers is often met through in-kind donations, volunteer services and grants, but the issue of sustainability is central to the

¹⁶⁴ SeachNetworking.com Definitions (2006), *Telecenter*, Retrieved February 3, 2006, from the World Wide Web: <http://whatis.techtarget.com>

¹⁶⁵ Digital Dividend, *Lessons from the Field: ICTs in Telecenters*, Retrieved February 3, 2006, from the World Wide Web: http://www.digitaldividend.org/pubs/pubs_02_tele1.htm

¹⁶⁶ *ibid*

operations of the various telecenters. In order to meet this need, most non-profit telecenters provide at-cost services.

These telecenters are meeting diverse needs, depending on location and purpose of establishment, and some of them are actually set up to address community needs, which include training and the introduction of ICT services. Considering the importance of meeting the internationally-agreed Millennium Development Goals, I am convinced that telecenters will play a major role in the exposure of the underserved to information and diverse opportunities. ICTs have proved effective in their application to education, health and general livelihood; hence the relevance of telecenters as a rallying point for information access and skills' development.

A Village Among Us

There are various models as far as telecenters in Nigeria are concerned, but a deeper look at the Digital Village model – and the Lagos Digital Village in particular – will be instructive. The Lagos Digital Village (LDV), located at the New Library Building in Ebute Metta (Lagos, Nigeria), is an Information Technology training and opportunity centre for Nigeria's youth. The vision of the village is to raise *“a new generation of Nigerian youth who are well equipped with appropriate Information Technology skills and are well positioned for personal development, nation building and global participation.”*¹⁶⁷

The project is key to bridging the digital divide and opens doors for many underserved young Nigerians, improving their values and quality of life, and helping them to attain greatest heights in the educational and job markets in which they would otherwise have never had the opportunity. The project is a multi-stakeholder partnership between Junior Achievement of Nigeria (a non-profit organisation), Microsoft (for-profit corporation) and the Lagos State Government – and it enjoys support from volunteer tutors and the Lagos Mainland Local Government. The project was commissioned on the 28th of May 2004 by the Executive Governor of Lagos State (Asiwaju Bola Ahmed Tinubu) and project delivery took off with the provision of a Lagos State-sponsored cyber café.

Programs available at the village include First Steps (*Computer Appreciation*); Intricate Details (*How to Build Your Own Computer*); Work Better (*Office Productivity Tools*); and Great Leap (*Internet and the World Wide Web*). Delivery ranges from 3 weeks to 2 months and courses are taught by a faculty made up of volunteers who are qualified Information Technology instructors who wish to contribute their own quota to the emergence of a New Nigeria where young people can compete favourably with their peers anywhere in the world after they might have been equipped with appropriate Information Technology skills.

It has been over a year that the project opened its doors to the eager young minds that sought their own share of intellectual capital that can help transform their lives. From the

¹⁶⁷ LDV Quarterly Report (2005). Retrieved February 1, 2006, from the World Wide Web: <http://www.lagosdigitalvillage.org.ng>

first call for applications, it was learnt that the project could not have come at a better time – introducing young people to new technologies, explaining the role of computing in the workplace and highlighting the possibility of personal development. Training is the digital village’s platform for impact – through which it provides capacity building, mentorship and opportunities.

In 2005, the project “increased its program reach, fine-tuned selection procedure to ensure a greater student retention ratio, and introduced an online platform for student recruitment”¹⁶⁸. The project’s website (www.lagosdigitalvillage.org.ng) allows students to register online – from getting to know about the various programs to submitting their application forms – without the need for any physical visit to the center until they show up for the entry test with their reference letters in hand. While maintaining local expertise, the center also continues in its bid to be globally relevant. Taking advantage of the ongoing global, regional and national ICT processes, the project has continued to print an image of its work on the minds of industry stakeholders. Such programs and outreach have produced program evaluation opportunities.

LDV staff also facilitate sessions around ICT issues in various meetings, including the United Nations ICT Task Force meeting in Berlin (2004); African Regional meeting on the World Summit on the Information Society (WSIS) in Accra (2005); Preparatory meetings on the WSIS in Geneva (2005); United Nations Committee on Development Information in Addis Ababa (2005); and various Information Technology seminars with Nigerian schools. Undoubtedly, telecenters in Nigeria have contributed to the huge task of bridging the digital divide and maintaining a ceaseless flow of knowledge exchanges across borders. There is also an evident spread of telecenters initiatives across Nigeria, many of them offering similar services – but all with the central aim of bridging the digital divide, and equipping users with appropriate opportunities that can help them compete favourably in the New Economy.

Ripples Across the Nation

Many years after computers and other Information Technology tools were available for use in Nigeria, technology was almost an exclusive preserve of corporate environments. But the situation was helped by many projects that sprung up (and are still doing so) in various regions of Nigeria – all towards the purpose of bringing technology nearer to the populace who would not have access at the workplace, or would need such out of the workplace but could not afford the expensive services at home. Some of these efforts include the Digital Villages (beginning with Owerri, then Lagos, and now Benue – with Akwa Ibom being planned) which are planned after the model of other Digital Villages supported by Microsoft and relevant stakeholders globally; Fantsuam Foundation’s ICT for Development efforts; the Victor Attah Digital Opportunity Center; AfriHub ICT Parks; and the Jigawa Informatics Institute.

¹⁶⁸ LDV Quarterly Report (2005). Retrieved February 1, 2006, from the World Wide Web: <http://www.lagosdigitalvillage.org.ng>

Having described the Lagos Digital Village, let me introduce you to the effort that kickstarted the Digital Village *movement* in Nigeria – the first of them all, Owerri Digital Village. The *Youth for Technology Foundation's* website¹⁶⁹ tells the story of the Owerri Digital Village:

Owerri is a rural town in eastern Nigeria with little electricity, no Internet Service Providers (ISPs) and prior to the establishment of this center, no digital phone lines. It is about 600KM from the former capital, Lagos State and is home to approximately 600,000 people - most of which are of Ibo descent and are predominantly farmers or traders. The Owerri Digital Village (ODV) is a community technology center that offers IT skills development and training to Nigerian youth in an effort to develop entrepreneurial spirit, skills and passion for technology. ODV is a one-stop center where young people have access to need-based information, acquire vocational skills and master the tools for fostering social awareness.

The goal of establishing the Owerri Digital Village was to stimulate rural development by facilitating access to information, learning resources and communication technologies by the Owerri Community. The Eastern region of Nigeria is evidently underserved as a result of the Biafran war, 1967-1970, where between 500,000 and 2 million Biafran civilians, especially children, lost their lives to malnutrition and died from starvation during the war. The Biafran war still affects the Ibo people today. Because there very few top ranking democratic and military leaders that are from the Ibo region, this region of Nigeria is generally underserved and unfortunately is not on the governments top priority for infrastructure provision.

The Owerri Digital Village is a successful model and a realization of YTF's mission to use technology creatively to enable under-served youth to acquire the tools, problem solving skills and confidence for successful lives. Multi-media connected PC's, printers, scanners, educational software and books (related to global affairs, technology, entrepreneurship and education) are available for program member's use at the center. The goal is to help Nigerian youth make their dreams a reality through developing new technology skills to further their academic studies and gain viable employment opportunities. The center has four classrooms, three administrative offices, one technology resource center, a board room and a seminar room.

Owerri Digital Village has transformed the lives of the local community and schools. It has provided internet, telephone and fax services that are being utilized to conduct local business activities and enhance teacher training. Computer training has provided jobs for the youth, who now have access to a resource center with books and journals on technology and entrepreneurship. By the end of 2003, 300 young women and men and 10 schools will participate in and complete Youth for Technology programs designed to educate and inspire young people to value technology entrepreneurship, foster a technology culture and assist them in their quest to develop technology acumen and passion. The Owerri Digital Village opens doors for hundreds of Nigerian youth, improves their quality of life and helps them to attain the greatest heights in the educational and job markets in which they would otherwise have never had the opportunity.

¹⁶⁹ <http://www.youthfortechology.org/owerri.html>

If there is one non-governmental organisation that understands holistic and appropriate application of ICTs towards development in Nigeria, it is the Fantsuam Foundation. Located in the silent city of Kafanchan in the north of Nigeria (unlike the busy Lagos and oil-rich Niger-Delta regions), Fantsuam Foundation implements a lot of projects that translate ICT opportunities into better livelihoods for the rural community where they operate, and their *Bayanloco Community Learning Center* initiative is a worthy example within Nigeria's telecenters space. The project aims to use ICT as an additional tool for poverty alleviation in rural communities in Nigeria, by promoting access to ICT facilities and relevant skills for rural women. Community Learning Centers – with a library, computer access and community radio – are being established in rural communities with no access to telephone or electricity. Project components include training in computer literacy and microfinance. In exchange for getting a desktop, laptop, and satellite phone, communities commit to maintaining the CLC, investing in a car battery to power the computers, and keeping up community databases¹⁷⁰.

While earlier efforts have shown the commitment of the Nigerian civil society (along with private sector and government partners) to the extension of ICT perimeters – towards the enhancement of literacy rate and improve livelihoods – some government efforts also reflect the state of the telecenters movement in Nigeria. One of such is the *Victor Attah Digital Opportunity Center* (VADOC). On the state government's website¹⁷¹, the story of VADOC is well told:

... Akwa Ibom State Government under Obong Victor Attah as the governor, has adopted some revolutionary strategies to fast-track the State to the information and communication highway. To step out, the Governor established a Bureau of Science and Technology in 2002 during his first term in office. The governor appointed Dr. Linus Asuquo, an engineer and scholar to take charge of the Bureau. The Bureau swung into action and drew up a blueprint to transform the State from a civil service economy to technology-driven one. The governor reappraised operations of the Bureau and upgraded it from a bureau under his office to a full-fledged ministry in the first three months of his second term in office... Victor Attah Digital Opportunities Centre, VADOC, is submerged in the belly of the Ministry of Science and Technology at No. 84 Obio Imo Street, Uyo. Apart from the sign-post, very little is known about this facility which is an embodiment of unfathomable potentialities. It is one of the Information and Communication Technology components of the Science and Information Park. The Center is so far his only achievement which the state governor has granted the privilege to be named after him. This alone is enough to speak in volumes about the Center. VADOC is designed for human capacity development in Information Technology and the Research and Development in Science, Engineering and Technology, among others.

Also fitted at VADOC for maximization of intellectual challenges are: State-of-art facilities in Information and Communication Technology, a research laboratory with modern equipment such as Atomic Absorption Spectrometer, technical workshop with modern machines for wood and material fabrication, pilot plant for production

¹⁷⁰ Women, Peace and Security Initiatives: Nigeria (2006). Retrieved February 3, 2006, from the World Wide Web: <http://www.peacewomen.org/campaigns/Nigeria/Nigeria.html>

¹⁷¹ <http://www.akwaibomstategov.com/edit2-2.asp?ID=1368>

of grease from spent engine oil and three computerized classrooms with digital cameras, television sets, projectors and a smart board. The Center also has an Executive Boardroom for video conferencing and telemedicine, executive suites, a dining hall and a conference cafe hall. The government's technology efforts are not exclusive to Uyo, the State capital, but rather, the Administration also envisages in its Science and Technology Policy to create and fund a Digital Information Village for Information Technology Experiments, DIVITE, in each of the local government areas of the State. They are expected to be served within Akwa-NET and will have access to National and International Information Networks.

Still on government efforts, the *Jigawa Informatics Institute* comes readily to mind as it serves the northern region of Nigeria, while serving as a visible example of what can come out of deliberate government efforts and private sector motivation. Multistakeholder partnerships are clearly the way forward out of the digital divide quagmire which developing nations are exposed to. The institute's *Informatics Professional Development Centre (IPDC)* offers "a wide array of certified and end-user application courses to professionals and corporate executives, empowering them with the necessary skills and recognition in their profession. Culminating from an emerging need for holistic skills development by corporations and individuals, IPDC has recently evolved into a one-stop training centre for corporate learning with the introduction of soft skills training. The IPDC's programs include PC Upgrade and Maintenance, A+ Certification Preparatory Course, vendor-specific training, and its professional certificates in e-Commerce Development and Implementation, among others"¹⁷².

While governments and the civil society have played prominent roles in the establishment of telecenters towards possible literacy improvement and national development, the private sector has clearly shown that telecenters models can be sustainable (and eventually profitable) while delivering social value to its specified audience. The *AfriHub ICT Parks/Mega Centers*, with three centers established to date, are setting the pace in this area of deliberate intervention. The *AfriHub ICT Park* in Nsukka is located at the Central Campus of the University of Nigeria and had its Cyber Center opened in December 2004 while the Training Center was commissioned in January 2005. Covering an area of 1,200 square meters, the project occupies two levels of a central building on the campus. While its Cyber Area (for public internet access services) has 100 workstations and runs on dedicated C-band bandwidth, the Training Center has three dedicated rooms with a student capacity of 15-30, and video conferencing facilities. Other planned services are campus hotspots, wireless backbone and telephony¹⁷³.

The Next Few Years

In the next few years, the Nigerian telecenter space will be different from what it is today – more sustainable, expanded and better networked, at the very least. Over the past few months, there have been discussions on the need to ensure sustainability for telecenter efforts (especially in the face of spiraling power and access costs) and there are

¹⁷² About Informatics Institute Kazaure (2006). Retrieved February 3, 2006, from the World Wide Web: http://www.informaticsgroup.com/ihl/global/showMiddleEastAfrica_nigeria.htm

¹⁷³ Culled from the AfriHub website, www.afrihub.com/Pages/ICT%20Parks/afrihub_parks.htm

indications that a lot of telecenter models have considered (or are considering) adopting social enterprise models that take them away from the traditional grant-seeking cycle to enterprises that are able to generate revenue by providing at-cost services. Even if the rising cost of power supply and exorbitant internet access costs remain, social enterprises will be able to develop additional services and adopt proactive strategies that will keep them sustainable.

Telecenter efforts in Nigeria are also considering expanding their reach in order to extend the far-reaching effect of the services they provide. For example, Junior Achievement of Nigeria is already considering the need to establish another Digital Village in *Ajgunle* – a suburb in Nigeria that has come to be known with creative musical talents but remains underserved in terms of average quality of life. But beyond sustainability and expansion, the need for networking is beginning to emerge. While working towards the same goal of bridging the digital divide and improving livelihoods, telecenters in Nigeria have not been able to benefit from the possible strength of synergy. However, ongoing talks between Lagos Digital Village, Owerri Digital Village and Telecenters.org (a project of the IDRC) may just signal the emergence of a telecenter network that will stay atop sector growth in Nigeria – and the West African region at large.

Telecenters in Nigeria are a clear indication of the potential use of ICTs for development, and this explains the reason why the 2006 *Youth Agenda* session – hosted by the Lagos Digital Village and Paradigm Initiative Nigeria – will bring young people from various areas in Nigeria to consider the need for telecenters (or knowledge centers) in rural areas. With this, and other activities and efforts, the telecenter space in Nigeria will visibly change the way people relate to ICTs – taking them from the level of seeing ICTs as elitist tools to the point where they integrate ICTs into their everyday life (for the purpose of achieving better livelihoods). Telecenters will also help Nigeria in her drive to achieve the Millennium Development Goals, considering their possible reach and community buy-in. Telecenters are not magical spots that will solve every problem in Nigeria, but they will go a long way in moving us from where we are towards our desired destination – a New Nigeria.

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3.5 When the basics are cutting-edge: radio for development in Africa

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Over the last eight years, Dieter has served as ICT policy analyst and researcher for international organizations and foundations in Southeast Asia, Europe and North America. He has also held multiple research fellowships on ICT for development policies, among other with the Development Studies Institute, London School of Economics (LSE), the Programme on Comparative Media Law and Policy at Oxford University and the Carnegie Council on Ethics and International Affairs, New York.

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Abstract:

This essay focuses on a communication medium that has been somewhat sidelined by the enthusiasm for ICT-centred development initiative: radio. Community or micro radio applications have been around for more than fifty years. They have been successfully used around the world in support of various development objectives and continue to exhibit a great potential for promoting sustainable and equitable economic, social as well as political development. The essay seeks to highlight the experience and major benefits that are associated with community radio implementations in Africa. It will also identify some policy and regulatory challenges for maximizing the development potential of community radio and finally it will touch upon the question of how community radio and Internet can most fruitfully complement each other in supporting African development.

In the shadow of all things Internet

The arrival of the latest generation of powerful digital information and communication technologies, most notably the Internet, have reinvigorated the vision of a global information revolution. Many hope that the new global network of networks holds considerable benefits in store for developing countries and might even enable a degree of leapfrogging in infrastructure and economic development. Others are less optimistic and point to the global digital divide as example of how the Internet rather exacerbates than eliminates extant global disparities.

The verdict on the overall impact of the Internet on global development may still be out, but the widespread visibility and intense attention that this debate has garnered raises a serious concern. A focus on the Internet and new digital technologies in general, might inadvertently sideline a generation of older, conventional ICTs that continue to play an important, if not the dominant, role in development communication. Most prominently among these conventional ICT for development ranks **radio**, be it organized as a public, private and community-driven endeavour.

The old new kid on the block

What makes radio a prime tool for communication and information in developing country contexts?

First consider infrastructure issues. Effective Internet access depends on a host of what can be quite complex infrastructures, starting from sufficient bandwidth in international backbone access, a reasonably dense physical network across the country as well as available and affordable last-mile connectivity, all to be set-up, maintained and operated by experienced experts.

In contrast to that, a self-containing community radio station is estimated to cost no more than USD 20,000 or in stripped down mobile version only USD 3000. Radio transmission

does not rely on cables or physical networks that are often slow and expensive to deploy. It is less vulnerable than physical communication networks to many types of natural disasters, such as earthquakes. Radio equipment is robust, can be flexibly and quickly established and requires only a modicum of a few weeks of training for local staff.

On the user equipment side, radio receivers are extremely cheap, compact, ubiquitous, easy to use and robust in contrast to computers or other Internet access devices. Their electric power intake is substantially smaller than other ICTs and innovations such as receivers with solar strips or wind-up radios reduce electricity dependence to a minimum. For example two minutes of manually turning the crank on a wind-up radio is enough for thirty minutes of power-independent radio reception. All this makes radio a prime information tool for the African context in particular for rural areas.

The numbers bear out this claim. Worldwide more than 20,000 radio stations are estimated to be in operation, while over 2 billion receivers are estimated to be in circulation, making radio by far the most widespread ICT.¹⁷⁴ And while Africa trails all other continents quite significantly with regard to Internet access lines per capita it is with an estimated 238 radios per thousand people far ahead of, for example, Asia, which only counts 145 radios for thousand people.¹⁷⁵

With regard to the communication possibilities, radio cannot quite rival the interactivity and range of tools that the Internet can afford, but it shines through other qualities.

First, it is incredibly user-friendly, by relying on simple, oral information transmission that makes it accessible to the large group of illiterate persons that is effectively shut out from direct engagement with the Internet. Oral presentation also makes it an ideal tool for the cultivation of linguistic diversity and locally-adapted communication. Where the Internet often struggles with complicated standardization problems for languages that use non-Roman scripture, radio can easily capture oral testimony and help very localized communities share information among each other in their very own local idiom and accent. And the radio can afford higher levels of interactivity than meets the eye at first sight. In particular when organized as community radio, arrangements such as listening clubs or local content committees, as well as interactive presentation formats, such as announcement and greeting shows or phone-in discussions radio reaches a high level of participatory engagement.

Listening to the radio can also be accommodated much more easily in busy daily schedules than computer use. One can take the radio to the workplace, even into the fields or the market and listen to it while doing other manual chores. Internet access in contrast is far less mobile and requires full mental and physical attention.

¹⁷⁴ Colin Fraser and Sonia Restrepo Estrada. 2001. *Community Radio Handbook*. Paris: UNESCO.

¹⁷⁵ R. Gerster and S. Zimmermann. 2005. *Up-scaling Pro-poor ICT-Policies and Practices: A Review of Experience with Emphasis on Low Income Countries in Asia and Africa*. Berne: Swiss Agency for Development and Cooperation.

Radio programming can further a wide range of development aims. It can help farmers by broadcasting weather forecasts, information on market prices, or programs on new or improved farming techniques. It can be a vital source for health education and awareness raising through programs on hygiene issues, reproductive health techniques, virus warnings, etc. And radio can be used for a wide range of distance learning courses across age groups and disciplines.

Community ties can be strengthened, particularly when the radio initiative is community-owned, involves different stakeholders on its program committee and focuses on locally relevant programming that reflects the specific local culture and concerns.

What's more, radio continues to play a key role in the deepening of young democracy. It can provide educational programs that educate listeners on their rights and entitlements as active citizens. It can help national and local governments to enhance outreach to communities through announcements and information on services. Transmission of public consultations, hearings and government meetings can make the state and its workings significantly more transparent and accountable to the citizenry. Phone-in shows, as well as Q&A sessions with civil servants can provide a public platform for individual citizens to register and discuss complaints, alert the public to irregularities, demand explanations from elected officials and put ideas, and viewpoints to deliberation of a wider public. All this makes radio an important public discussion space that furthers the type of community, collective identity and eventually nation-building. Studies of the consolidation of post-colonial states have identified newspapers as creating this type of ideational space that proved key for forming national identities. It could be argued that radio fulfils a very similar function, only that it is significantly more accessible and inclusive than the intellectual space created by newspapers for a literate, well-to-do, mostly urban elite.

Finally and not to be forgotten: radio is about music and rhythm, providing the indispensable sound background to daily life and an excellent source for entertainment and relaxation.

Given all these these benefits it is not really surprising that radio has proven highly popular among women in rural Africa, with more than 93% of women believed to be listening in, even if many of them might not directly own a receiver.¹⁷⁶

Radio in Africa

Radio in development has a long history. Early experiments with community radio in the developing world began to take roots after the second world war with a radio station for Miner's in Bolivia and Radio Sutatenza in Colombia as the pioneering stations

¹⁷⁶ George Sciadas. 2005. From the Digital Dived to Digital Opportunities: Measuring Infostates for Development. Montreal: Orbicom (http://www.orbicom.uqam.ca/projects/ddi2005/index_ict_opp.pdf).

established in 1947. The first community radio station in Africa was established in 1982 in Kenya supported by UNESCO. However, restrictive government regulations and other problems impaired the take-off of community radio until the early 1990s. Eventually the end of Apartheid in South Africa, the demise of the cold war and its ideological stranglehold on media policies, as well as broader dynamics of democratization and decentralization across the continent paved the way for a more conducive environment for community radio. Mali, Burkina Faso, Namibia and South Africa have been at the forefront of radio liberalization, but many other countries have followed suit and contributed to a proliferation of radio services across the continent.

Here some examples of radio projects and their impact upon development objectives:

Radio to support peace-building and reconciliation

Radio Kwizera (Hope) is a donor funded initiative for the refugee camps at the Burundi/Rwandan border. Established to foster peace, reconciliation and public education its programme ranges from refugee-tracing services and health education (e.g. HIV awareness via soap operas) to greetings and music. Audience surveys have confirmed the popularity of *Radio Kwizera* and a performance evaluation has recommended to extend this model to other refugee camps.¹⁷⁷

Radio to support political competition and democracy

A gradual opening of the media sector in Ghana since the mid-1990s led to more than 45 FM applicants being authorized to operate in 1998. In order to support interactivity, many of new stations included call-in shows into their regular schedules. These interactive shows turned out to be very popular. They provide an informal setting for the discussion of daily affairs. Callers need not speak English but are encouraged to use the vernacular they feel most familiar with. Elections in 2000 underscored forcefully the vitality of the new sector. An open debate among presidential candidates was broadcast live on TV and radio at the eve of the general elections. Question were fielded by experienced journalists as well as a wide range of social groups, including students, unionists and women activists. Finally in the December 2000 elections Ghana made history when the ruling party was voted out of office after a more than 20 year long grip on power.¹⁷⁸

Radio for diversity, inclusiveness and gender equality

In Mali the signing of the Bamako Declaration on Radio Pluralism by the new Mali president in 1993 gave a boost to the nascent radio sector and encouraged NGOs, rural association and other social groups to become involved. Mali even became the first African country with an all-women radio station. Today the media sphere in Mali boasts 40 independent newspapers and 60 radio stations. Importantly access to media for the

¹⁷⁷ Alfonso Dagon. 2001. *Making Waves: Stories of Participatory Communication for Social Change*. New York: Rockefeller Foundation

¹⁷⁸ See Carla W. Heath. 1999. 'Negotiating Broadcasting Policy: Civic Society and Civic Discourse in Ghana' In: *Gazette* Vol. 61. No. 6: 511-521; Daniel Brown. 2000. 'A Landmark for African Democracy'. *International Herald Tribune*. November 21, 2000; Freedom House. 2001. 'Freedom in the World 2000-2001 Survey'.

80% of the population living in rural areas has considerably increased. By 2000 77% of Mali citizens are within the reach of at least one community radio station, up from 64% two years earlier. While the state monopoly mainly broadcast in French, a language not spoken by the majority of the population, programming is now available in many local languages further augmenting accessibility. Education on political rights and civil liberties is an important component in programming and observers note the strong commitment of the radio community to the democratization process. Audience surveys identify the radio as predominant information source. For example 76% of men and 50% of women regard the radio as main source for information on HIV/Aids.

Radio and Internet: A synergistic relationship

A new ICT rarely fully substitutes other ICTs. It rather transforms the usage practice of older ICTs and assumes a complementary role in relation to the. The same goes for Internet and radio, which provide many opportunities for a mutually beneficial relationship, including

- *Bridging effect*: the higher penetration rate of radio and its accessibility for illiterate people can be harnessed to widen access to the Internet. Radio call-in shows, such as the ones pioneered by Radio Kotmale in Sri Lanka allow listeners without Internet access to pose questions or online search queries that the radio hosts the carries out in the studio;
- *Research effect*: With the Internet radio producers gain unprecedented access to a global knowledge base and are equipped with formidable tools to research material for their radio programming;
- *Sharing effect*: Online platforms provide an excellent platform to share digitized radio programming across the world and integrate content produced elsewhere into local programming;
- *Community of practice effect*: Discussion groups, blogs and basic emails allow even the most remote community radio organizer to plug herself into the global community of practice of radio practitioners and avail herself of the collective wisdom and practical experience gained in this field elsewhere.

Conclusion

All these considerations give reason to believe that the arrival of the Internet will reinvigorate rather than usher in the demise of radio for development in Africa. Radio is THE most widespread and accessible modern ICT available for Africa. Its potential versatility, robustness and community focus makes it a prime tool for addressing communication and information needs in development in Africa, now and for the years to come. Challenges to fully exploit this potential remain. Restrictive licensing regimes, funding and staffing problems and at times irresponsible programming in the form of hate speech hamper the development benefits of radio on the continent, but these challenges pale in comparison to the daily benefits that radio delivers to Africans of all walks of life. Radio is tuned in to promoting development. Stay tuned for more.

3.6 Training teachers using blended e-Learning. A Public Private Partnership project in South Africa

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Christian is a founding member of the global *think tank 30* of the Club of Rome, founding member and spokesperson of the German *tt30 Deutschland* as well as member of the executive board of the *German Chapter of the Club of Rome*. He holds degrees in physics, philosophy, theology, and engineering and is author of several articles and books.

Christian Merz acts as a Senior Researcher for the Campus based Engineering Center (CEC) of SAP Research in Karlsruhe. Currently he is working in the KPI (Knowledge People Interaction) Research Program that addresses research topics around Collaborative Working Environments, Human Computer Interaction and Knowledge Management. Dealing with emerging countries he co-shapes the research strategy on using ICT for socio economic development and is involved in projects like the Africa Drive Project or the integrated EU-Project ATHENA to introduce new methodologies for vocational training. He joined SAP Research 6 years ago and contributed innovative solutions in the area of Ubiquitous Computing before he concentrated on Knowledge Management. Christian started in 1997 as an SAP employee and consulted SAP customers internationally on SAP implementations for about 3 years. He received his Diploma in Physics from the Albert-Ludwigs-University in Freiburg, Germany.

1. Introduction

This is a time of exciting changes. Information and communication technologies (ICTs) are altering almost every aspect of our lives, our societies, and our business. Driven by Moore's Law, at a breathtaking speed, computers are getting faster, smaller and cheaper. Information can easily be copied and distributed. Information has become the decisive, the "ultimate resource".

Especially in the early days of the information age, people thought ICT could help solve almost any problem. However, today we know, that ICT cannot meet people's high expectations. Many visions turned out to be unrealistic. For instance, people hoped that unlimited access to information would immediately drive development – of both individuals and societies. Great potential was seen in ICT's contribution to improve the situation of less developed countries.

As we know today, information is, of course, a necessary prerequisite for education and development – but not a sufficient one. Several other conditions have to be fulfilled that access to information does actually improve the situation of individuals and societies. People do not only need access to information, they also need to have the skills, the ability to use the information, and, finally, they must actually use it. Each of these steps has turned out to be much more difficult than assumed. Take for instance access to information. How does someone in a rural area in Africa get "access to information" – if there is no sufficient power supply, no computer, no software, no connectivity to the Internet, if this person has never before used a computer, maybe not even seen a keyboard and so forth.

In the following we will present a project which addresses some of these problems for a specific African context. The "Africa Drive Project" is a Public Private Partnership (PPP) which utilizes ICT in order to improve the education system in South Africa. [1]

2. Objectives

In the recently published Global Information Technology Report [2], South Africa was ranked 96 of 104 countries for the quality of its mathematics and science teaching. One reason for the teachers' poor grades is the restrictive educational policy of the former apartheid era, when black and colored pupils did not get proper education. Another cause is the raging AIDS epidemic, which has struck down many South Africans in their prime. The shortage of suitably qualified teachers is probably the main reason for the low performance of pupils, which was illustrated by the 2003 final (Grade 12) examination results: Just 9% of Grade 12 pupils achieved a higher-grade pass in mathematics, 17% in physics. [3] President Mbeki, mindful of aforementioned situation stated that "Special attention will need to be given to the compelling evidence that the country has a critical shortage of mathematics, science and language teachers, and to the demands of the new information and communication technologies." [4] This is the educational situation in South Africa, which the Africa Drive Project (ADP) seeks to improve.

ADP is a research and development project aiming at developing, testing and implementing innovative teacher development programmes, methodologies and technologies. In an international Public Privat Partnership (GTZ [5], SAP [6], North-West Provincial Department of Education, North-West University, Siemens, eDegree, etc.) the project addresses the challenge of providing a scalable solution that will improve the educational situation of South Africa. This project produces appropriate models (a learning, technology and cost model) for the provision of blended learning–models that could be rolled out and used to inform politicians on educational development and the introduction of ICT into learning.

ADP addresses most, if not all of the objectives of South Africa’s ICT strategy, as can be seen in a White Paper on e-Education, which the South African Department of Education published in 2003. [7] The key objective is to improve the knowledge, skills and competencies of educators in the delivery of learning to learners at secondary schools. The focus is on educators teaching Natural Science, Mathematics, Technology (ICT) and Business Studies (Entrepreneurship). English communication skills and computer literacy will also form part of the programme. While the programme delivers the formal elements of education and training, it also addresses the role of the educators in the community. The teachers learn how to raise the awareness of social and environmental issues such as the prevention of HIV/AIDS and Tuberculosis, or the conservation of the environment.

The project utilizes state of the art e-Learning technologies for teaching school teachers. The teachers are enabled to integrate these technologies into their teaching at schools, thereby improving their skills and increasing their knowledge. Ultimately, this investment in multipliers pays off because the gains are multiplied by each and every pupil which benefits from better education.

Eventually relevant learning, technology, cost, transformation, evaluation and monitoring models will be developed on which the rollout of blended learning in a developing society could be based.

3. Learning Model

In-service teachers can enroll for a formal Advanced Certificate in Education (ACE). Blended learning, incorporating different kinds of delivery methods like Web Based Trainings, Group Work, Assignments and others is delivered and facilitated at 8 learning centres, established at secondary schools in rural areas of the North West Province of South Africa. These learning centers have been equipped with the necessary technology and they have local staff to facilitate training and to provide technical support. The learning programme is structured into 18 monthly cycles that consist of bi-weekly facilitated sessions. In these facilitated sessions the learners are guided through the learning activities which they can then complete at their own pace in the following two weeks. Most learning activities include Web Based Training material that is in an electronic format, electronically trackable and in principle accessible by as many learners as necessary.

LEARNING UNITS	CREDITS	NQF	NOTIONAL
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		LEVEL	HOURS
<i>FUNDAMENTALS</i>			
Language and communication skills for educators	12	5	120
Computer Literacy for educators	12	6	120
Life orientation for educators	12	6	120
Total	36		
<i>CORE</i>			
Curriculum studies	18	6	180
Management and organisation of learning	18	6	180
Entrepreneurship and career guidance for educators	6	6	60
Total	42		
<i>ELECTIVES (one plus research project)</i>			
Mathematics for educators	30	6	300
Physical science for educators	30	6	300
Biology for educators		6	
Economics for educators		6	
Information technology for educators		6	
Mechanics for educators		6	
Electrics for educators		6	
Graphics for educators		6	
Research project for educators	12	6	120
Total	42		
Grand Total	120		1200

Figure 1: The ADP Curriculum

Following the principles of “Outcomes Based Education” regular assessments are conducted on the knowledge taught. Thereby the learner is assigned credits associated with notional hours, an estimation of hours that have to be spent on the learning material in order to absorb the knowledge. The whole qualification takes 1200 notional hours.

4. Technology Model

A commercial learning platform is used to deliver and manage blended e-Learning at the learning centres. The SAP Learning Solution consists of different components and is hosted by a professional service provider. The solution has been customized to reflect the local context of learning provision in a rural, public service environment. Some of the technical challenges include connectivity, bandwidth availability, computer literacy levels of educators and learning material development. One of the notorious problems in rural Africa are power supply failures which require a backup solution in place that does not depend on power (e.g. paper based). Furthermore, available bandwidth is by far smaller than in industrialized countries. Therefore, to overcome bad performance due to low data throughput technologies have been introduced that increase the data throughput

and lower the Wide Area Network (WAN) traffic by caching the content locally. This allows to share one ISDN line by 10-15 learners.

The human computer interfaces have been extremely simplified taking into account that many of the participating educators are using computers for the first time in their lives. Offering simplified interfaces, the system applies modern and advanced technologies like automated progress tracking and results storage in the backend system.

5. The Pilot Phase - Lessons Learned

The project team continuously monitors the impact of the programme and estimates the potential impact on socio-economic development. The 2 year pilot phase began in October 2004. At the end of 2005 half of the Learning Programme has been delivered to more than 250 registered learners. Since the programme has commenced about 100 learners have dropped-out leaving more than 150 active participants. Among the reasons for drop-outs are time constraints, non-sufficient pre-qualification, and family issues. Although there are several learning centers spread throughout the province in order to reduce travelling efforts, many of the learners nevertheless have to drive up to 4 hours in order to get to such a center.

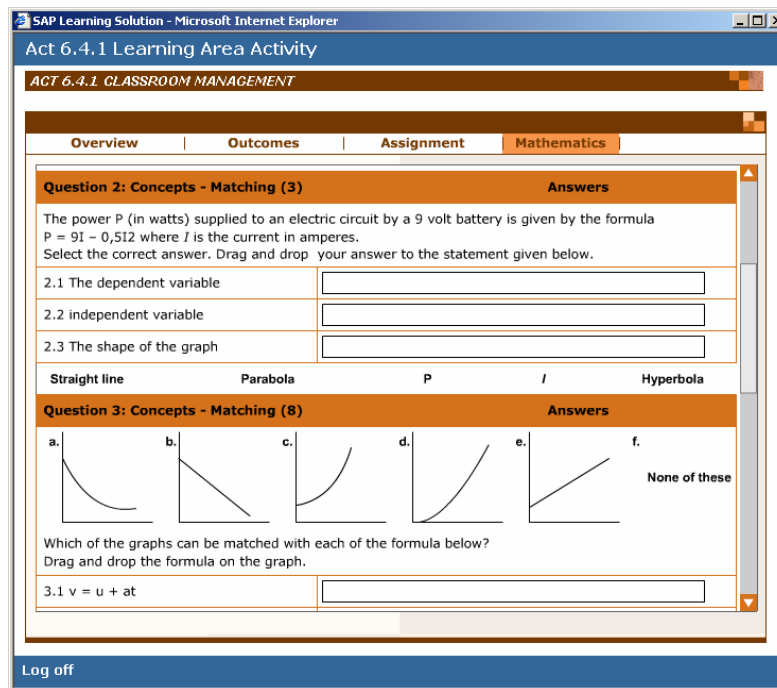


Figure 2: An example of an electronic assessment.

The pilot phase is most valuable and heavily used to refine the models to come up with a best practices solution to eventually roll it out. The most important lessons learned include the following.

5.1. General

There is one clear advantage of PPP projects like ADP. Due to their nature – i.e. a Public Private Partnership – they naturally get the support of governmental stakeholders at a higher level. This helps to attract the attention of politicians and accelerating decision making processes. Eventually teachers are employed by the government and the outcomes of the project must be driven by a political stakeholder for roll-out.

Such partnerships also have a number of challenges, however. They run the risk of copying best practices from industrialized environments and transferring them directly to a developing environment. It is essential, however, to address the needs of the local context. It is by no means clear that state-of-the-art technologies of the industrialized world can be used in other contexts. Sometimes they might not be appropriate at all. Sometimes they might, if the special circumstances like infrastructure, mindset and cultural setting are taken into account. The latter, in particular, seem to be underestimated frequently. ADP introduces change into an educational system and a mindset of people who are still affected by the indoctrination of the former Apartheid regime. This regime kept the black community away from higher education. Therefore, change management becomes very important to overcome technophobia and to enable educators to apply innovative methodologies in their own classroom, thereby multiplying the effect of skills transformation (“teach the teacher”).

Furthermore, a clear communication strategy is needed to avoid misconceptions about the project objectives. All relevant stakeholders, the project management, the steering committee as well as the people directly involved should have the same perception of the project objectives and methods.



Figure 3: *Face to Face Session in one of the Learning Centers (Mmabatho Campus of North-West University)*

5.2. Basic Infrastructure Impediments

In general, communication backbones in developing countries, connectivity and bandwidth in particular, are not sufficient to run ICT based learning. This is one of the ubiquitous restrictions when introducing ICT that rely on the paradigm “always online”. The ADP response to that is to reduce Wide Area Network (WAN) traffic to the fullest extent possible. There are several methodologies that can help reduce the network load,

e.g. using data caching and compression mechanisms or avoiding applet downloads. Although in many cases beneficial rich media content is avoided where possible to also limit data throughput. Moreover, one has to provide back-up or offline solutions (e.g. paper based) for the frequently occurring power supply or data network failures.

5.3. Delivery of Learning

The curriculum and learning programme has to be aligned with national standards. This is crucially important especially when implementing large scale education initiatives. The South African National Qualification Framework [8] provides an excellent theoretical framework to implement learning programmes that deliver certain qualifications like the Advanced Certificate in Education.

In favour of a solution that allows to scale up to thousands of learners, Web Based Training materials should be applied to the largest extent possible, including automated tracking of learning progress. The process of monitoring the know how-transfer can very effectively be streamlined by embedding electronic assessments. Once learner assessment has been conducted immediate feedback to the learner is required to keep people motivated.

The learning content must be quality assured before it is delivered to the learner. Ideally it has to be reviewed by stakeholders that are not involved in developing the content. In the case of ADP, critical readers of the University (e.g. faculty for education) are responsible for that task.



Figure 4: The facilitators of the Learning Centers.

5.4. Learners

The learner expectations have to be synchronized with project objectives. Often strategic objectives of large scale education initiatives are difficult to break down into objectives that are easy to understand for the participants. It helps to have a clear communication strategy and to keep messages simple.

Right at the beginning of the productive pilot phase of ADP it became clear that one has to take into account basic infrastructure impediments with regards to public transport and traveling distance. People in rural areas are highly dependent on public transport. Therefore, bad weather and traffic conditions can easily double the effort to get to the learning centers. As long as PCs and network availability are not widely available at people's home participating learners must be selected out of an area within reasonable traveling distance.

When planning the project one has to think carefully about what motivates the learner and take into account her/his personal circumstances. Most participants certainly expect better payment in the mid-term once they have successfully acquired a further qualification. However, others are just excited to be part of the world of ICT which is new to them. They realize that ICT provides the chance to improve the quality of their personal lives.

5.5. Learning Centres

Initially during the pilot phase the differing local school policies should be considered. For example, establishing unified facilitator support and opening hours is very helpful. Furthermore, local authorities are needed to implement new policies. This is very much a change management issue as local schools must execute policies that might differ from existing practice. Best practices extracted from the experiences made in the pilot phase are then used for the roll-out conception.

The system administrators' contracts need to be adapted to the new learning environment (cf. working hours during school holidays). Facilitators who used to work as teachers are acting now as moderators with different working hours, required skills and adapted duties.



Figure 5: *Participating teachers*

Finally, as the project tries to overcome the education crisis in South Africa via a “teach the teacher”-approach, it is most important that facilitators are very well trained for their

new job. The skill levels of system administrators and facilitators have to be enhanced as much as possible.

5.6. Learning Management System (LMS)

Modern Learning Management Systems (LMS) provide powerful tools to run blended e-Learning initiatives effectively and efficiently. Among others, these tools can be very helpful for centralizing course catalogue administration or progress tracking. The LMS in use at ADP is also designed to maximize actively participating user accounts and to ensure scalability of learning delivery. This is especially important if you want to improve the skills and competencies of a large target group like in ADP.

With regard to technology the configuration of LMS functionality to local needs and context is one of the most important issues. In case of ADP, an LMS that has been built for companies from industrialized countries to train their employees has been adapted to reflect the requirements of public service teacher education in rural areas. While most of the adaptations could be done via standard customizing, some of the adaptations also required source code modifications. Therefore closed source systems that are not specifically built for the project target group are not suitable.

The system modifications include, to simplify and contextualize Human Computer Interaction and backend data models. Simplification of Human Computer Interfaces is essential in order to take into account the learners' level of computer literacy. Often the very first experience is the key to whether a learner will remain in the programme or not. As the initial modifications to simplify user interactions have been mostly based on assumptions by experts (User Interface designer, Programmers) the pilot phase is also used to do an extensive usability study that is driven by the end-users themselves. After one year of working with the system, participants were able to express potential improvements and personal preferences on the usage of the Learning Portal. At the beginning of the pilot phase this wouldn't have been possible because of missing exposure to computer technology.

Generally the end-user feedback is encouraging but the initial valuable input suggests improvements with regards to navigation paradigms (learnability and memorability), portal content consistency, the usage of parallel windows, and the visibility of system status (e.g. when loading documents).

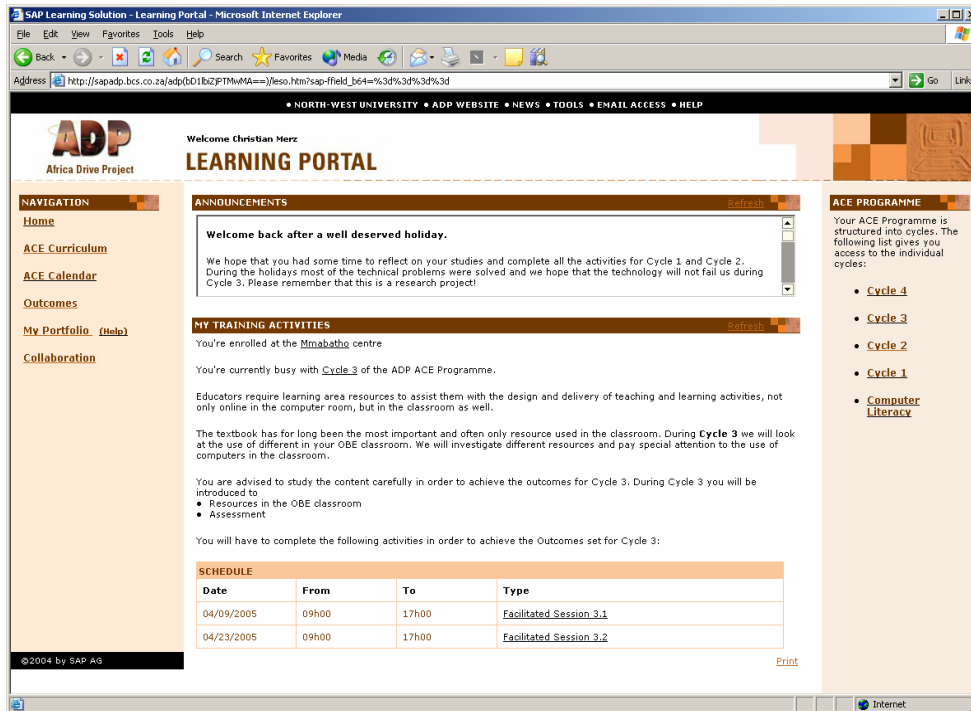


Figure 6: The User Interface of the Learning Portal

Finally, the skills to maintain and operate technically advanced systems effectively are usually not found in previously disadvantaged institutions [8]. Hence professional hosting providers must be in place to ensure 24x7 system stability and availability. This should include second level technical support in case of problems. First level support is handled by system administrators at the learning centers.

6. Outlook and Summary

Eventually the first phase of roll-out in the North-West Province is planned for 2007 reaching approximately 200 schools. The lessons learned stated above are taken into account for the roll-out conception to reflect best practices of the 2 year pilot phase.

ADP has proven that ICTs can be adjusted to local contexts to promote education and socio-economic development. ICTs can therefore help to overcome the widening gap in the use of technology between the rich and the poor. Although ICTs certainly do not solve all problems of education and development and sincere realism is needed, ADP proves that ICT can help promote the educational situation in developing countries. However, South Africa is surely not a typical “developing country”, due, for instance, to its history and its comparably advanced economy. In other African countries some of the bottlenecks of ADP, like bandwidth and connectivity, would be much more of a problem.

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3.7 Energy for ICT Development

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Abstract

The development of ICT is highly dependant on the availability of energy. To a certain extent, Africa's level of energy consumption reflects its level of development. In the years to come, if Africa is to achieve technological as well as social and economic development in keeping with its demographic growth, its energy consumption must significantly increase. Despite the many challenges facing African development, its geographic situation, and zones are endowed with immense solar energy and hyrdo power potential and some places are also conducive to harnessing wind power. Moreover, given the level of dispersion of rural communities and the recent developments of alternative energy technologies, decentralised exploitation would be the optimum strategy. The potential contribution of renewable energy to ICT development is explored and a strategy for a sustainable energy culture that caters for the fast pace of ICT growth is devised.

1. Introduction

It has become widely acknowledged that the rising environmental and economic cost of fossil fuel energy has made renewable energy a basic requirement for the development of Africa. An estimated 130 million people in Sub-Saharan Africa live in areas where the fuel wood consumption outpace the natural regenerative capacity of the forest (FAO (1995)). This figure clearly demonstrates the environmental challenges that need to be addressed if a sustainable increase of energy availability is desired.

Another major challenge facing aspirations for ICT growth in Nigeria in particular is that the country is characterized by a large expanse of land with isolated communities, often lacking basic services required for ICT such as electricity. The erratic supply of electricity and the inadequate geographic coverage of less than 40% of the population is a wall that may be prove to be too high to climb and has to be bypassed. Renewable energy provides the shortest, if not the only route to satisfy the energy needs required to achieve the ICT development goals. It is very fortunate that renewable energy opportunities match with rural development requirement.

The International Bank for Reconstruction and Development (2002) reported that 94% of firms in Nigeria single out infrastructure as their biggest problem and that 97% of firms have their own power generators. In the current situation, this is a prime reason that makes Nigerian firms at a disadvantage compared to, for instance Ghana where energy costs less than half as it does in Nigeria. The Nigerian government estimated in the early 1980's that the growth of power requirements would be in the order of 20% per annum for the next 20 years (Zarma (2006)). Needless to say, this estimate did not anticipate the rapid growth of personal computers and mobile communications usage that characterized much of the 1990's. In other words, the 20% growth is a modest estimate of what is really needed to fulfil the needs of growth in the ICT sector.

Nigeria currently produces 15.59 billion kWh of electricity (CIA Factbook 2003). By way of comparison, this is about 5% of the Brazil's electricity production on a per capita basis. At least 325 billion kWh of electricity are needed to bring Nigeria to level of the developed world.

2. Renewable Energy Opportunities in Nigeria

The dramatic increase needed in energy availability to the Nigerian population necessitates a sustained effort to exploit sustainable, renewable energy sources. Energy will be required to satisfy the needs on three broad fronts:

- i- large-scale for general use (eg for village infrastructure, hospitals);
- ii- medium-scale such as for private houses, lighting columns); and
- iii- small-scale such as for individual devices (eg mobile phones, PC's).

Availability of energy has to be addressed on all three fronts in order to effectively achieve the desired effect. Although different forms of renewable energy satisfy the requirements on different scales, there will be a positive knock-on effect whereby an overall increase of energy assists in alleviating energy poverty on the other scales. Hence, both small and large-scale energy production facilities have to be considered.

2.1 Hydro Power

About a third of Nigeria's electricity comes from hydro-power, which is less than half the hydro power potential. Small-scale hydro power exploitation is under-utilized. Zarma (2006) has indicated that small-scale hydro power represents the most convenient and economic option for addressing rising energy demands, particularly for the scattered rural population of Nigeria. Large-scale power availability is best addressed through further exploitation of this form of energy.

2.2 Solar Energy

Until the discovery of fossil fuels, pre-industrial revolution energy was derived from the sun in its different forms (direct and indirect). The African continent is located between the tropics where the solar rays are abundant. The solar energy should allow remote houses to have electric power, particularly in areas not connected to the national grid.

Today, solar technology is being driven mainly by advances in photovoltaics. Photovoltaic cells, working silently can generate electricity wherever the sun shines even in places where no other forms of electricity can be obtained. Photovoltaic technology is used to produce electricity in areas where power lines do not reach. In developing countries, particularly in remote rural areas, it is significantly contributing to the improvement of living conditions. Nigeria in particular is endowed with high potential of solar energy (Iloje (2004)). Photovoltaic (PV) technology, can offer a variety of practical alternative energy solutions for Nigeria. Once in place, the equipment requires little maintenance, primarily due to the fact that there are no moving parts. Batteries collect current from the solar modules, storing the incoming electric energy as chemical energy; commonly referred to as the charge. As needed, this chemical energy can be given off as electric energy, the discharge. Appreciably no energy is lost but stored in the battery for later use, as the case on overcast days. A major hurdle is the high cost of PV cells. Africa in general needs to acquire the technology required to produce PV cells to satisfy the local requirements.

2.3 Other Renewable Sources

Although not as abundant as solar energy, wind energy can provide a significant contribution to energy in certain parts of Nigeria (generally increasing south to north and in less vegetated areas). Environmentally-friendly biomass and geothermal energy can also provide a sizable contribution.

Small-scale devices, such as mobile phones and computers can be fed energy from their own energy providers. Examples include portable solar energy panels used to charge mobile phones and the innovative “wind-up” energy production for the “\$100 laptop”. These are two fine examples where high-technology can work without being hindered by lack of electricity infrastructure. It goes without saying that the use of energy provided by

such means leaves the precious little electricity to be used in other sectors, where such forms of energy generation is not available.

3 The Way Forward

The Energy Commission of Nigeria, together with the United Nations Development Program (UNDP) have developed a master plan for the development and utilization of renewable energy resources in Nigeria. This provides a promising step in working to satisfy the energy requirements for ICT development. The Centre for Renewable Energy Development in Nigeria (CREDN) has been promoting the proliferation of renewable energy as a the most sustainable energy solution to Nigeria's energy requirements. Cooperation between the public and private sectors, both on a national and regional level, is of paramount importance if Nigeria is to fully utilize the potential ICT can contribute to overall development. The high set-up cost of certain renewable energy types means that without such cooperation, this potential cannot be fully exploited. The best way forward for Nigeria, and Africa in general, to generate the necessary amount of electricity is to produce energy from a pool of renewable resources arranged in an optimal way to ensure that every kWh of electricity is used where it is most needed.

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3.8 Proposal for a Education Complementary Currency

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Bernard Lietaer, the author of the forthcoming *“Of Human Wealth”* (Citerra Press, 2006) and *“The Future of Money”* (London: Random House, 2001), has been active in the domain of money systems for a period of 25 years in an unusual variety of functions. While at the Central Bank in Belgium he co-designed and implemented the convergence mechanism (ECU) to the single European currency system. During that period, he also served as President of Belgium’s Electronic Payment System. His consultant experience in monetary aspects on four continents ranges from multinational corporations to developing countries. He co-founded one of the largest and most successful currency funds becoming its General Manager and Currency Trader. He was Professor of International Finance at the University of Louvain; and is currently Visiting Professor at Naropa University in Boulder, CO. He is the co-founder of ACCESS Foundation, an educational non-profit whose objective is to communicate best practices in the domain of complementary currencies (www.accessfoundation.org).

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This note summarizes the key elements of a complementary currency concept proposed in the Saber conference in Brazilia about education and learning in the 21st century. It is organized in five sections as follows:

- Background
- Objective
- Scope
- Approach
- Issue of Inflation Control

Background

When Brazil privatized the mobile telephone industry, it introduced a 1% tax earmarked for educational purposes. This Education Fund has now grown to about 3 billion Reais (US\$ 1 billion). One conventional solution would be to use these funds to directly pay for scholarships to worthy students and/or improve the educational facilities of the country. Prof. Schwartz raised the question whether it would be possible to design a complementary currency that would provide a multiplier of learning compared to these conventional solutions. This note documents one of the possible designs to achieve that aim.

Objectives

The objective of the educational currency is to increase the learning capacity as well as strengthen the social coherence of Brazilian society, by enabling a learning multiplier effect without risking inflationary pressures in the economy as a whole. The ultimate objective is to make Brazil one of the world leaders of the knowledge economy of the 21st century.

Scope

The main learning focus of this project is to multiply the number of students that can afford to obtain a college-level education in Brazil. However, this project will also have a direct impact on the entire primary and secondary school learning potential, as well as improve the cross-generational and social awareness of the kids that will go to college. Although this project is original as a whole, there are significant and successful precedents of each of its key components, as will be indicated below.

Approach

A special targeted currency, whose unit could be called *Saber*, would be issued under highly controlled conditions as explained below. Its face value would be nominally the same as a Reai, and would be redeemable for paying tuition of higher education programs in participating universities. This would be a paper currency (although electronic accounts can be kept where they will accumulate), with all the security precautions against fraud used for printing conventional national currency.

However, there are significant differences between Sabers and conventional money. They are officially redeemable only for tuition payments for higher education for a particular year (e.g. for the 2005-6 academic year). If they aren't used for payment of higher

education during that year, they could be exchanged for Sabers of the next academic year (2006-7), but with a penalty of 20% in order to give an incentive not to hoard that currency beyond the deadline.¹⁷⁹

The process starts with the Ministry of Education assessing the capacity of universities to handle increased enrolment for a future year (say 2005-6). Two key aspects are taken into account: the existing spare capacity for additional students under today's mode of operating; and the (much larger) capacity when distant learning technology is successfully implemented. Distant learning could involve for instance only 1 month of on-campus presence per trimester, while the other two or three months the courses are available in the cities and villages of origin of the students. Therefore the universities' capacities will significantly increase as the new distant learning technologies spread.

Let us assume that the additional capacity of enrolment for the year 2005-6 is estimated now at 30,000 students; and that the average tuition costs 3,000 Riais per trimester. The Ministry of Education would make available now 90 Million Sabers per trimester for the year 2005-6. What happens with those Sabers?

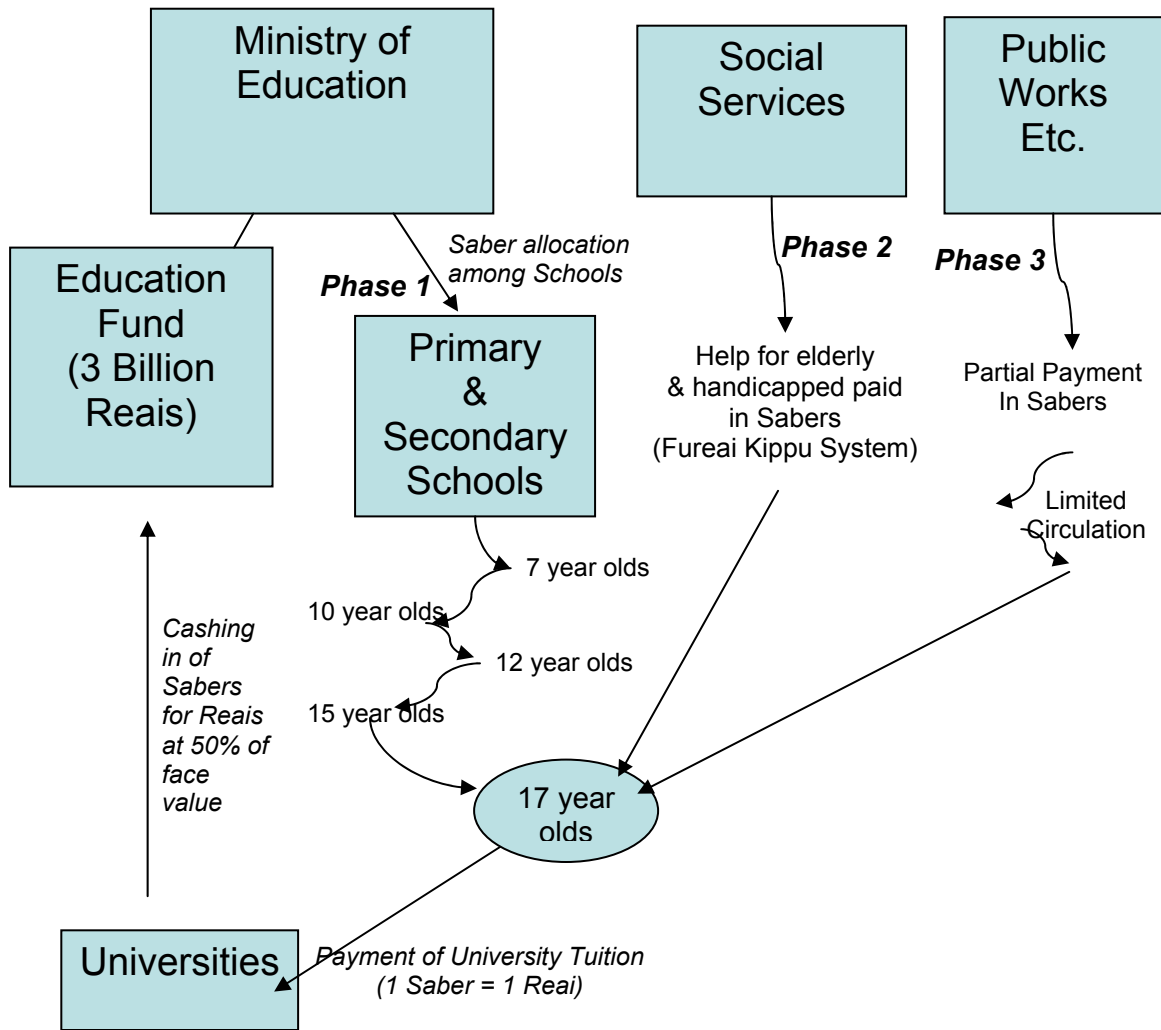
There would be several phases of implementation for the program (see graph on next page).

During **Phase 1**, the use and circulation of the Sabers involve only the Ministry of Education from beginning to end. This Ministry allocates the Sabers among schools in economic areas where typically funding will not be available for higher education, even for students that would be capable of such learning. The schools make the Sabers available to its youngest students (e.g. 7 year olds) at the condition that they choose a mentor from an older class (e.g. a 10 year old), and work with him or her on their weakest school topics. There is successful precedent of such a system in the form of the use of Time dollars for mentoring among kids. Such a process has proven remarkably effective particularly in underprivileged schools in the US and the UK.¹⁸⁰ The self-esteem of the older kids is dramatically increased, and they become a better student him or herself as one of the best ways of learning something is to teach it. Furthermore, it seems that it is not OK to let your mentee being beaten up for being "too good a student", something that unfortunately isn't uncommon otherwise. Finally, the younger kid obviously learns as well. The Sabers are transferred to the older kid in compensation for the hours spent mentoring at a rate to be determined (e.g. 5 Sabers per hour). The 10 year old can do the same thing with a 12 year old; and the latter with a 15 year old, until at last we are dealing with a Senior of 17 years old who aspires to go to university next year. That 17 year old can use the Sabers he or she accumulated to pay all or part of the tuition for the participating universities.

¹⁷⁹ Such expiration penalty is a simple form of demurrage. Demurrage is a time related charge on a currency, similar to a parking fee for that currency. It gives a.o. an incentive not to accumulate the currency beyond the deadline. The full effects of demurrage systems is explained in B. Lietaer "Of Human Wealth" pg 104 -110.

¹⁸⁰ Edgar Cahn "No More Throw-Away People" (Essential Books, 2000).

“Saber” Complementary Currency System = Learning Multiplier



NB: 1 Saber is equivalent to 1 Reai redeemable for tuition in higher education

There has been a pre-negotiated agreement between the Ministry of Education and the participating universities on the conditions of reimbursements of the Sabers. The marginal cost of having an extra student is only a fraction of the average tuition that the university would normally charge (often in the order of 10%). Furthermore, these are students that the university would otherwise not have at all. Therefore, from the university’s viewpoint, any income from additional students beyond their marginal cost is a gain to the university.

In the graph it has been estimated that the Ministry of Education would reimburse in Reais the Sabers received as tuition payments at 50% of their face value. But because

investments in distant learning facilities would significantly increase the capacity of the universities, but further reduce the marginal cost of an additional student, reimbursements at a lower percentage should become increasingly acceptable to the universities as well.

Notice that the full “additional learning” that the Saber complementary currency enables is a factor of the order of 10 times what a direct allocation of the resources of the Education Fund to scholarships (2 times for the university discount of Sabers, and 5 times for the circulation of the Sabers in mentoring of kids).

As the capacity of the universities increases over time, and the Saber system has established its credibility, additional ways to bring the Sabers into circulation can be envisaged. Examples of such additional channels are described next as Phase 2 and 3 of the project.

In **Phase 2**, one could apply what has been very successfully done with the *Fureai Kippu* system in Japan.¹⁸¹ What it would mean is that children or adults who are helping elderly or handicapped people could also earn Sabers. This program has been very successful in Japan and has contributed to reinforce cross-generational interaction in that country, not to speak of the substantial improvement of the quality of life for the elderly that is obtained without burdening governmental budgets.

In **Phase 3**, one could imagine extrapolating the system to other governmental projects. For instance, let us assume that the labor content of a road construction project is estimated at 100 million Riais, and that the base salary for that work is 100 Riais per week. One could make the following offer to the workers on that project:

- either you take the 100 Riais per week;
- or you accept only 80 Riais plus 70 Sabers (for a total of 150 equivalent Riais).

Obviously people who have kids ready to go to university would have an obvious interest in accepting the second offer. But even those who don't have kids may prefer to choose that option, and use the Sabers in partial payment in whatever good or service from someone who has a kid that wants to go to college.

The benefits include that the government would be able to reduce the labor budget for the building of the road from 100 million Riais to 80 million Riais. In addition, more students of modest means would be able to obtain higher education, and Brazil would further improve its human capital as well.

Issue of Inflation Control

One of the objections that one may expect from the IMF or conventional economists is that the creation of a Saber currency would risk fueling inflation.

This section explains why – if the Saber system is managed correctly – no such risk exists either in the Saber currency itself or in the national currency.

¹⁸¹ See Lietaer “Future of Money” pg 201.

The reason is that the creation of Saber currency is different from the creation of conventional national currency in four significant ways:

- Sabers are ultimately redeemable into Reais only by universities through the Ministry of Education, and only for educational purposes.
- the quantity of Sabers issued is controlled by the Ministry of Education on the basis of the university capacities to increase the number of students, so that no more Sabers are created than the universities can accept as additional students, thereby avoiding the inflation problem generated by a currency that is created in excess of the goods or services available;
- the Sabers have an expiration deadline at which point the 20% penalty comes into play, so that the Sabers would circulate only for a limited and controlled time period, thereby further reducing the probability that excess currency is circulating;
- and finally, the gradual expansion of the system would ensure that any problems can be dealt with before they become significant.

All three of these factors make the dynamics of the creation of Sabers fundamentally different from those of conventional national currency, and avoid that they would have an inflationary impact similar to what would happen if additional billions of Reais were pumped into the national economy.